UNIVERSITY OF ALBERTA

INSTRUCTIONAL PREFERENCES OF STUDENTS IN A COLLABORATIVE NURSING PROGRAM

by

AVALEAN LOERKE

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of MASTER OF NURSING

Faculty of Nursing

Edmonton, Alberta
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Abstract

Nurse educators have known for many years that there is a relationship between students' learning preferences and their behavior in the teaching-learning situation. Instructional preference, as an aspect of learning style, has relevance and importance for adult students and a humanitarian approach to education. Although studies have investigated the learning styles of nursing students in several contexts, the theoretical approaches have varied and the findings are inconclusive. This study addresses the lack of learning style information about Canadian nursing students. Specifically, it uses a demographic questionnaire and the Grasha-Riechmann Student Learning Style Scales (GRSLSS) to identify and explore the instructional preferences of students in a new collaborative nursing program. Findings suggested that first year students in this nursing program prefer both interactive and solitary learning activities, but tend to be more strongly oriented to one or the other. This was confirmed through a statistically significant negative correlation between the participant and avoidant dimensions. A preference for active class involvement was associated with a low proclivity for evading learning activities requiring interactions with teachers and peers, and vice versa. Although six instructional preferences were assessed, findings were statistically significant for only four. One or more of these preferences were significantly influenced by age, pre-entry academic achievement and intended completion program. For example, in this study, older students preferred more sharing and involvement with teachers and peers in learning situations than younger students. In addition, students with high school as their pre-entry academic achievement were significantly less likely than those with non-university post secondary preparation to prefer learning activities in which they interacted with teachers and peers. The subjects who intended baccalaureate program completion reported stronger preferences than those intending diploma completion with regard to working alone to achieve academic rewards. Although statistically significant, independent preferences were considered suspect because of poor internal reliability for this dimension.

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Chapter One

Statement of the Problem

Nursing students present many challenges to nurse educators who are expected to provide quality education that facilitates the development of professional attributes. Specific challenges include the identification, utilization, and development of the learner's unique characteristics, preferences, and skills in a teaching-learning situation (Knowles, 1984; Rogers, 1986). To assist the educator with these tasks, it is generally accepted that demographic data and academic achievement scores will be part of the basic information collected about entrants to schools of nursing. However, a review of the literature reveals a lack of basic information about the learning skills, preferences and attitudes of nursing students relative to the teaching-learning situation. Without specific empirical data, nurse educators are required to make predictions and decisions on the basis of their practical experience with post secondary learners, and their understanding of adult learning theory. Since there are no formal assessments, nurse educators are obliged to assume that students have the characteristics and skills appropriate to the teaching-learning environment they create. Although the accuracy of this judgment may be confirmed, after the fact, through course and instructor evaluations, a more proactive and accurate determination has greater potential for improving the quality of nursing education. Therefore, the focus of this thesis is on the identification of one group of nursing students' instructional preferences.

The material is presented in five chapters each of which addresses a specific topic: statement of the problem; review of related literature; methodology; data analysis and results; and discussion, implications, and recommendations. References and appendixes are included. The purpose of this chapter is to identify the problem and questions for which the methodology was developed, the data were collected, and the findings were reported. It begins with a discussion of the background material that supports

instructional preference as an area for investigation in a nursing context. This discussion culminates in a statement of the problem, purpose, and questions with which this study was concerned. Limitations, delimitations, definitions, and assumptions are specified.

Background

Students and educators exert a great deal of effort to achieve the goal of learning as a process and a product. In so doing, they are involved in an interaction among themselves, the content, and the environment. Although learning theories establish the roles and relationships for learners, teachers, and content, they do not describe the unique characteristics or attributes that the learner, teacher, or content bring to the learning situation (Rogers, 1986). If the learner is the focus in the learning process, then learner attributes that impact on the teaching-learning situation become important. One approach to studying these attributes is to consider the learning style of students to determine how they prefer to learn.

A review of the learning style literature highlights inconsistencies in the terminology, theoretical approach and components for describing this construct. Consequently, there are several theories and measurement instruments, rather than a single, comprehensive theory (Curry, 1983a; Keefe, 1982). However, the most cited and comprehensive definition of learning style identifies personality, processing, and perception as key components in the interaction between the learner and the environment (Keefe, 1979a). These traits are also evident in the conceptual framework proposed by Curry (1983a) for organizing current learning style theories and their assessment instruments. According to this initial framework, instructional preference, information processing, and cognitive personality style are three distinct, inter-related components forming a learning style gestalt.

Instructional preference refers to a desirable learning environment from the learner's perspective, and identifies the learning style component that is most observable, flexible, and amenable to change (Curry, 1983a, 1983b, 1987). In a more recent refinement of the

framework, instructional preference is differentiated into environmental and social conditions that the learner characteristically desires in a teaching-learning situation (Curry, 1990b). Environmental conditions relate to the physical setting, whereas social conditions refer to the interpersonal contacts a student desires with teachers and peers during the learning experience. As a combination of environmental and social circumstances, instructional preference is believed to impact on the learning process by positively or negatively affecting motivation. Motivation, in turn, influences task engagement which leads to active processing of the information to be learned. The psychological investment in learning, understanding, and mastering the required knowledge is influenced by personality, which subsumes factors such as self-concept, self-esteem, and attitudes. According to the revised framework, instructional preference, information processing, and cognitive personality style are still considered major learning style components, but they are linked to outcomes such as motivation and task engagement. As components of learning style, instructional preference, motivation, level of engagement, and cognitive processing interact with metacognitive skills and content to produce an identifiable learning outcome.

A consideration of the social condition implemented in a teaching-learning situation is appropriate for adult learners since they may identify their learner role in terms of their need for social interaction and control (Endorf & McNeff, 1991). Furthermore, students in a post secondary learning environment enter the situation with expectations and pre-existing patterns of interacting with, and responding to, the environment (Cross, 1981; Nordstrom, 1989). Inherent in these expectations and patterns are social circumstances which can be identified and utilized by educators to develop compatible teaching-learning situations (Fuhrmann & Grasha, 1983).

In addition to highlighting the variations in the theories and approaches, a review of the literature also supports the importance and relevance of considering learning style components in an educational context. For example, benefits such as improved

performance and personal development are associated with attention to instructional preferences (Dunn, Beaudry & Klavas, 1989; Grasha, 1972; Newble & Entwistle, 1986). Furthermore, students tend to select learning strategies compatible with their learning styles, which has implications for course and class planning (Loesch & Foley, 1988). Notwithstanding its potential practical value, there are limited normative data for adult learning style since much of the research has been conducted with children and adolescents (Dunn & Griggs, 1988; Keefe, 1982). The data that are available for adults is generally limited to age and gender differences in learning style, and is reported for university and college undergraduate students as a group rather than according to discipline (Grasha, 1990; Price, 1987).

According to DeBello (1989), learning style information is difficult to obtain through informal observation. Consequently, more formal or structured data collection procedures are required. In addition to providing information, a structured assessment provides a framework for reporting. This, in turn, promotes information sharing and its subsequent benefits for students and educators (Duckwall, Arnold & Hayes, 1991; Riechmann-Hruska, 1989). Furthermore, a formal approach to data collection involves the study participants in research from an experiential perspective, which may sensitize them to the investigative process.

An investigation of the instruments currently available to assess adult learning style reveals that few have a single focus, and several are a combination of processing and instructional preference elements or processing and affective components (Annotated Bibliography, 1982; DeBello, 1989; Ferrell, 1983; Grasha, 1983). However, at least six learning style instruments contain items related to instructional preference. The Grasha-Riechmann Student Learning Style Scales (GRSLSS) concentrates on social conditions (Riechmann & Grasha, 1974). The Learning Preference Inventory relates to processing and social conditions (Rezler & Rezmovic, 1981). A modification of Hill's Cognitive Style Mapping assesses social, environmental, and processing components (Lange, 1979).

The main focus of the Productivity Environmental Preference Survey (PEPS) is environmental and social conditions (Price, Dunn & Dunn, 1991). The Student Learning Style Survey emphasizes components similar to the PEPS (Friedman & Alley, 1984). Lastly, the Learning Styles Inventory evaluates social, environmental and cognitive elements (Canfield, 1992). With regard to these instruments, the GRSLSS focuses most directly on the interpersonal or social aspect of learning preferences. Consequently, the GRSLSS assesses preferences that may influence the learning motivation of post secondary students.

Nursing programs are considered post secondary education. As such, they can legitimately utilize information based on post secondary research. According to Nordstrom (1989) and Statistics Canada (1993), the norms characterizing post secondary students are changing. Since the profile of adult learners is changing, findings that previously provided norms and supported the application of learning style data to classroom teaching may no longer be valid. Previously, as a group, post secondary students were reported as being more interpersonal than impersonal; more collaborative than competitive in their instructional preferences (Andrews, 1981; Grasha, 1990). Although research findings were inconclusive, differences in preferences for social conditions in teaching-learning situation have been linked to age and gender (Loesch & Foley, 1988; Price, 1987; Riechmann-Hruska & Grasha, 1982). In light of the changing demographics of students in post secondary institutions, these findings about instructional preference may no longer be well-grounded.

A review of the nursing literature suggests that, unlike the post secondary situation, minimal research attention has been paid to the impact of educational and demographic trends on nursing students and their learning. This is not to imply that the relationship between learner and learning situation has been totally ignored. For example, it is generally recognized in nursing education that there is a relationship between the learners' interpersonal characteristics and the teaching-learning situation (Bevis, 1989a; de Tornyay,

1984). Nurse educators also recognize that different teaching and learning strategies demand different personal and interpersonal characteristics from learners (Bevis, 1989a; de Tornyay, 1984). In other words, information relevant to the social component of learning style has been considered and discussed by nurse educators as a being important to student learning. Furthermore, in conjunction with professional socialization, nurse educators attempt to develop specific interpersonal characteristics in students through the implementation of a learning philosophy and specific instructional strategies (Bevis & Murray, 1990; Diekelmann, 1990). Although social components are acknowledged as being relevant to nursing education, the interpersonal predisposition of student nurses vis à vis their instructional preferences has not been well researched.

Although several studies have investigated the learning style of student nurses, information processing has been investigated more extensively than other learning style components. Furthermore, the results that are available tend to be inconclusive. Without basic data concerning students' instructional preferences, nurse educators are required to rely on personal experiences and findings pertinent to post secondary education and adult learners when planning instructional strategies. This is a non-empirical method for identifying student nurses' expectations and perceived needs for the learning experiences in which they are involved. In addition, this approach does not provide basic information with which subsequent findings can be compared. In addition, the majority of learning style findings in nursing are based on American and British nursing situations which may not correlate with those currently found in Canadian schools of nursing. Consequently, there is a lack of basic information about the instructional preference component of learning style for students in Canadian nursing programs.

Problem Identification

The problem addressed in this study was the lack of learning style information about Canadian nursing students, specifically instructional preference data that could be incorporated into the planning and implementing of formal instruction.

Purpose

The purpose of this study was to identify selected Canadian student nurses' perceptions of their instructional preferences in teaching-learning situations involving nurse educators.

Questions

Research questions addressed in this study were:

1. What do available students in the 1992 entry collaborative nursing program perceive their instructional preferences to be in a formal teaching situation, with specific reference to conditions of social interaction and control?
2. Are there statistically significant relationships among the identified instructional preferences of available students in the 1992 entry collaborative nursing program?
3. Are there statistically significant differences in the identified instructional preferences of subgroups of available students in the 1992 entry collaborative nursing program as determined by age, gender, marital status, pre-admission academic achievement, dependents, or intended completion program?

Limitations

In this study, no attempt was made to determine if the preferences reported by the students correlated with actual behavior or the perceptions of others. Since the subjects were all in the first year of the nursing education program, the impact that length of time in the program might have on preferences was not investigated. Although the exposure to specific teaching strategies was reported, the quantity and quality of the exposure were not explored as factors influencing instructional preferences. The influence that other components of learning style, such as cognitive processing and personality style, might have on instructional preference was not considered. Instructional preferences were restricted to those that nurse educators could apply to students' educational experiences. Environmental preferences that have administrative implications for equipment purchases, facility renovations, and policy changes were not addressed.

Delimitations

The results can be generalized to first year nursing students in a collaborative program in Edmonton, Alberta, Canada. The data and their resultant findings are restricted to the instructional preference aspect of learning style, specifically to the amount of control and interpersonal interaction desired in the learning situation. Furthermore, findings were accepted as statistically significant at $p \leq .05$, but were reported as actual values if the significance level was less. Students responded to items on only one instrument to assess their control and interpersonal preferences.

Definition of Terms

The following are the definitions for the terms used in this study.

Collaborative nursing program is the nursing program which was initiated by the University of Alberta Faculty of Nursing, University of Alberta Hospitals School of Nursing, Royal Alexandra Hospital School of Nursing, Misericordia Hospital School of Nursing, and Grant MacEwan Community College School of Nursing in Edmonton, Alberta in 1991. The program is operationalized through a new curriculum that does not differentiate course requirements for students until the selection of a diploma or degree completion program at the end of second year.

Dimensions of the GRSLSS

Avoidant refers to an impersonal tendency to evade classroom learning and its related interactions with teachers and peers (Riechmann & Grasha, 1974). The avoidant dimension is operationalized through the total and mean scores for items 2, 8, 14, 20, 26, 32, 38, 44, 50, and 56 on the GRSLSS.

Collaborative represents an interpersonal preference to share ideas and talents, cooperate with teachers and peers, and use the classroom for social interaction and content learning (Riechmann & Grasha, 1974). This dimension is operationalized through the total and mean scores for items 3, 9, 15, 21, 27, 33, 39, 45, 51, and 57 on the GRSLSS.

Competitive refers to an impersonal inclination to work individually for rewards and to assume a leadership or dominant role in interactions (Riechmann & Grasha, 1974). The total and mean scores for items 5, 11, 17, 23, 29, 35, 41, 47, 53, and 59 on the GRSLSS determine the competitive score.

Dependent describes an interpersonal preference characterized by limited intellectual curiosity that depends on teachers and peers for structure and support (Riechmann & Grasha, 1974). The operationalized definition for dependent is the total and mean scores for items 4, 10, 16, 22, 28, 34, 40, 46, 52, and 58 on the GRSLSS.

Independent describes an impersonal preference to work alone and identify important content for self with a willingness to listen to the ideas of others in a classroom (Riechmann & Grasha, 1974). It is operationalized through the total and mean scores for items 1, 7, 13, 19, 25, 31, 37, 43, 49, and 55 on the GRSLSS.

Participant is an interpersonal preference for active class involvement in order to maximize the benefits and learning for all (Riechmann & Grasha, 1974). This dimension is operationalized through the total and mean scores for items 6, 12, 18, 24, 30, 36, 42, 48, 54, and 60.

Instructional preference is basically "the individual's choice of how to learn" (Curry, 1983a, p. 119), and "the individual's choice of environment" (Curry, 1983c, p. 12). For this study, choices for learning environment were restricted to interpersonal and control preferences, conditions that nurse educators can utilize for counseling and/or teaching situations. This excludes instructional preferences related to circumstances over which the nurse educator has no control: administrative policy, physical constraints of the environment , program budget, and course content. Instructional preference will be operationalized through total and mean scores for the self-reported responses to items pertinent to the competitive, collaborative, avoidant,

participant, dependent, and independent dimensions on the GRSLSS (see Appendixes A and B for items and dimension interpretations). The total score will range from 10 to 50, and the mean will range from 1 to 5 for each dimension.

Learning style is a gestalt composed of instructional preference, information processing, and cognitive personality style (Curry, 1983a). These components interact to provide the motivation, task engagement and cognitive processing necessary for the integration of new information (Curry, 1990b).

Variables of the Demographic Data Questionnaire

Age indicates the student's chronological age on January 1, 1993. Individual ages are grouped according to the following ranges of years: 19 and under, 20 - 24, 25 - 29, 30 - 34, 35 and over.

Current marital status is defined as the student's current interpersonal situation relative to marriage, according to a given list of options.

Dependents refers to the number of individuals expecting physical, legal or financial support from the student, according to a given list of options.

Intended completion program pertains to the student's plans to enter either the six month diploma exit program or complete the baccalaureate program when the second year of the collaborative nursing program is successfully completed.

Pre-admission academic achievement is defined as the highest certificate, degree or course level that the student reports as being completed prior to entry into the collaborative program, according to a given list of options.

Assumptions

For purposes of this study, several assumptions have been made. The first is that each of the preference dimensions exist and may be expressed by an individual in varying degrees. A second assumption is that students are interested in self-discovery activities and are willing to consider ways in which they can participate in nursing research.

Thirdly, it is assumed that the Grasha-Riechmann Student Learning Style Scales will accurately measure interpersonal interaction and control preferences in this population of post secondary students, as it has in other settings. The fourth assumption is that participants will report their responses to reflect their true feelings. Finally, it is assumed that the respondents are adult learners which implies that they are physically fully developed, capable of making mature judgments about themselves, are self-directed, and autonomous to some degree (Rogers, 1986).

Summary

This chapter includes background information and rationale relative to the problem addressed by the study. With reference to learning style, it was argued that an interrelationship existed between the content, the learner, and the learning environment. Instructional preferences were identified as being subsumed in learning style as social characteristics, which were considered relevant to the educational and professional perspectives of nursing. Instruments that could be used for the assessment of social conditions were identified, and the GRSLSS was specified as having an interpersonal focus. The lack of information about the interpersonal instructional preferences of student nurses was supported. Consequently, this deficit was identified as the problem underlying the study.

Three specific questions, concerning identification, relationships and differences between the perceived instructional preferences of Canadian student nurses, were formulated to resolve the problem. Instructional preferences were operationalized through the dimensions of the Grasha-Riechmann Student Learning Style Scales. The dimensions and other vocabulary used in the research were defined. Finally, the parameters under which the research was undertaken were discussed. In the next chapter, relevant literature will be further identified and discussed.

Chapter Two

Review of Related Literature

Nurse educators have known for many years that the methods by which material is presented may facilitate learning in one student yet hinder the learning for another. Although many theories have been proposed, a clear pattern has yet to emerge with regard to the interaction between the teaching situation and the characteristics and preferences of individual students. A survey of the literature suggests that findings in post secondary and adult education concerning learning style and instructional preferences may be applicable to nursing education and benefit both students and educators. However, there is limited information about student nurses' preferences in a teaching-learning situation. Furthermore, the available data may not reflect the current situations in nursing and post secondary education. Consequently, this study focused on identifying the reported instructional preferences of a group of students currently enrolled in a collaborative nursing program.

The purpose of this chapter is to examine the literature that is considered pertinent to the research. The specific topics that are discussed are the learning style concept, instructional preference as a component of learning style, determining instructional preference, and nursing students as post secondary students with instructional preferences.

Learning Style Concept

Learning involves an interaction between the learner, the teacher, and the content as they are mediated by a theory of learning (Rogers, 1986). Behaviorist theories are based on a stimulus-response perception of learning, in which the teacher directs the process through stimulus selection and response reinforcement. The teacher role is active as compared to a more passive learner role. Cognitive theories of learning focus on the learner's processing of the information, and the nature of the knowledge itself. The

emphasis is on the way responses are created, how perceptions are organized, and the influence of feedback on the development of insights. The teacher orders material to promote student mastery of the desired content or knowledge, which is the primary concern. According to humanist theories, the scope of learning is broader than merely responding to stimuli or meeting the demands of new knowledge, in that increased learner autonomy and competence are emphasized. Furthermore, these theories describe learning as an individualized process for satisfying personal needs within a social setting. The teacher role is facilitative, and focuses on enabling the student to exercise control over the material and the desired learning changes.

One way students exercise control over the learning situation is through their unique learning style, a concept that appeared in literature, as a hypothetical construct, as early as 1892 (Keefe, 1979a). A survey of the literature on learning styles immediately highlights the range of definitions that theorists adopt to describe this abstraction (Dunn & Griggs, 1988). For example, learning style is the way in which individuals respond to internal and external elements and stimuli (Dunn, Dunn, and Price, 1979). Lange (1979) and McCarthy (1987) explain learning style as a perception and processing technique. Conversely, Schmeck (1982) perceives learning style simply as an information processing strategy. Since learning style involves information exchange, it is sometimes described as effective communication (Hunt, 1979, 1982). According to Canfield (1992), learning style is an affective motivator for students during an educational experience. Based on these definitions, learning style is a response to stimuli, a perception and processing strategy, a communication technique, and a learning motivator.

A frequently cited, comprehensive definition of learning style is "cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (Keefe, 1979a, p. 4). With reference to this definition, cognitive aspects are personality-related learning variables that are associated with information processing. Affective traits refer to

attitudes, opinions, and motivational processes that stimulate, direct, and sustain the learner's attention. Physical/physiological traits include both environmental factors that influence learning, and biological factors of the individual that impact on the learning situation. Although Keefe (1982) defines the components, he does not indicate how they interact.

While some authors use learning style and cognitive style interchangeably to refer to the same construct, the majority appreciate them as being complementary but different (Dunn, Dunn, & Price, 1979; Merritt, 1989). For example, Keefe (1979a) presents cognitive style as one of the components of the learning style gestalt. Price (1987) differentiates them on the basis of environment and processing, with learning style related to "variables in the environment that affect how individuals prefer to learn", and cognitive style concerned with "variables that affect how one prefers to process information once they take it in through the senses" (p. 3). Since Kirby (1983) does not believe that learning style should be divided into its components, cognitive and learning style are simply defined as "the habitual route a person takes to get meaning...in a formal setting or an informal one" (p. 43).

In addition to trying to clarify the relationship between learning style and cognitive style, attempts have also been made to explain the related concepts of learning strategies and learning preference. Learning preference generally involves choosing one learning situation or condition over another (Curry, 1983a, Rezler, 1983). Several researchers have described learning preference as the aspect of learning style that is concerned with the individual's likes and dislikes for sensory modes, conditions of learning, and learning strategies (Linares, 1989; Ostmoe, Van Hoozer, Scheffel, & Crowell, 1984; Wells & Higgs, 1990). By comparison, learning strategy is explained as a personal coping mechanism used to translate the presented information into a meaningful form (Curry, 1983a, 1983c; Schmeck, 1982). Consequently, learning preference is associated with

environmental circumstances and perception, whereas learning strategy is related to processing.

Overall, there appears to be agreement that teaching-learning activities utilize the learner's personal learning style, which is comprised of components such as cognitive style, learning strategy and learning preference. However, current terminology and definitions do not consistently and clearly differentiate the processes, attributes and interrelationships inherent in the learning style concept. Curry (1990a) likens this confusion to the blind men's perceptions in the fable about the elephant. Learning style is symbolized as the elephant, which is described in parts but not conceptualized as a whole.

Instructional Preference as a Component of Learning Style

In an attempt to clarify the existing data, Curry (1983a, 1987) developed a conceptual framework for learning style which categorized selected theories according to three classifications: instructional preference, information processing, and cognitive personality style. As demonstrated in Figure 1, Curry's (1983a) conceptual framework is depicted as onion layers, with cognitive personality style as the innermost layer and instructional preference as the outermost layer. "Learning behavior is thus fundamentally controlled by the central personality dimensions, translated through middle stratum information-processing dimensions and given a final twist by interaction with environmental factors in the outer strata" (Curry, 1983a, p. 117). The flexibility and potential for change varies from layer to layer. Instructional preference and information processing are believed to interact with each other and have the greatest potential for change. Cognitive personality style is perceived as being more stable and permanent, and is described as interacting directly with information processing and indirectly with the environment. Marshall (1987) supports the topology's validity and concludes that it is appropriate for "classifying learning style models and instruments into meaningful structure" (p. 427).

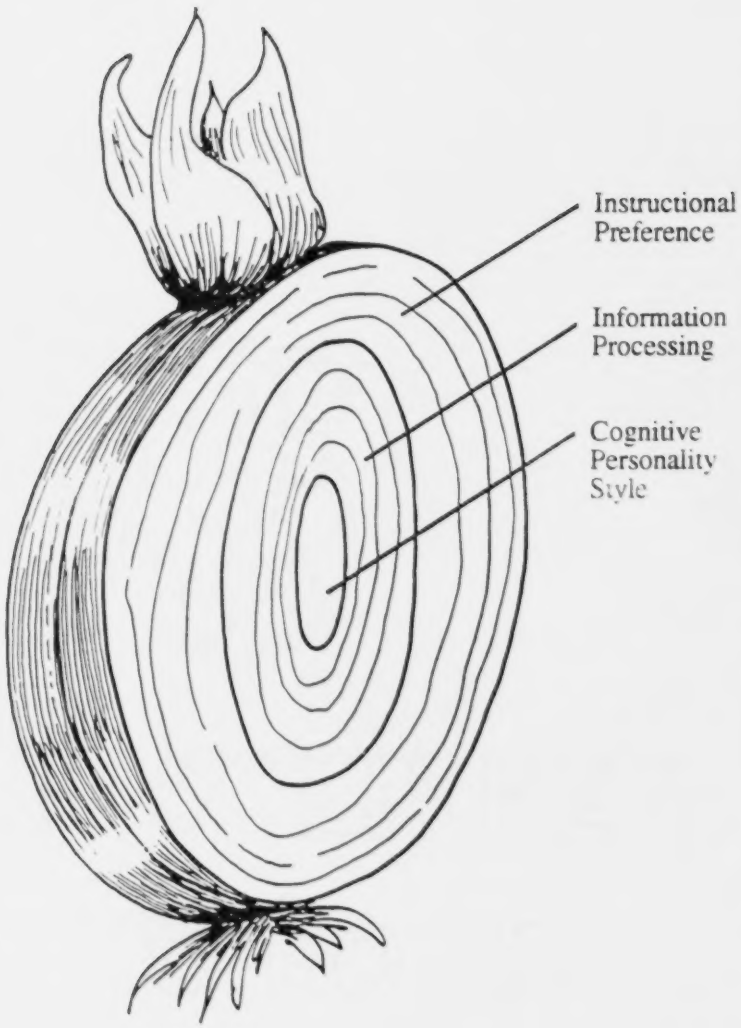

Figure 1. Conceptual framework for organizing learning style theories.
Note. From "An Organization of Learning Style Theory and Constructs" by L. Curry, 1983, in Learning Style in Continuing Medical Education (p. 118) by L. Curry (Ed.), Ottawa, Ontario: Canadian Medical Association.
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Although Curry (1983a, 1987) reviewed the reliability and validity data for over twenty instruments, only nine were considered to have acceptable psychometric support. These nine instruments were then classified according to the framework. The theorists relevant to instructional preference are Rezler and French, Riechmann and Grasha, and Friedman and Stritter. Their learning style instruments are concerned with direct assessment of the learning environment in which people prefer to learn. The theories selected for information processing were those developed by Schmeck, Ribich, and Ramanaiah; Tamir, Schiffman, Elstein, Molidor, and Krupka; and Kolb. Their hypotheses focus on the intellectual approach people take to assimilate information. The work of Witkin, Briggs and Meyers, and Kagan is categorized as cognitive personality style. They concentrate on the underlying and relatively stable personality dimensions that impact on data gathering and processing. Although the measurement instruments in each category share a dominant focus, the assessment variables differ from theory to theory.

Curry's (1983a) framework organizes the various learning style conceptualizations, but it does not place learning style contextually within the learning process. However, this deficit is addressed in Curry's (1990b) taxonomy of learning style concepts which is summarized in Figure 2. According to this taxonomy, instructional preference is differentiated in terms of environmental conditions and social conditions that impact on motivation. Motivation influences the degree of task engagement and cognitive processing. The degree of task engagement is monitored by the need for competence, the learner's self-concept in the situation, and the perceived value of the task. Through task engagement, cognitive controls are accessed so that the processing work required by the new learning task can be undertaken. Personality, which subsumes factors such as self-concept, self-esteem, and attitudes, influences motivation and engagement through its indirect interaction with instructional preferences (Curry, 1983a). According to Curry's (1990b) framework, instructional preference, information processing, and

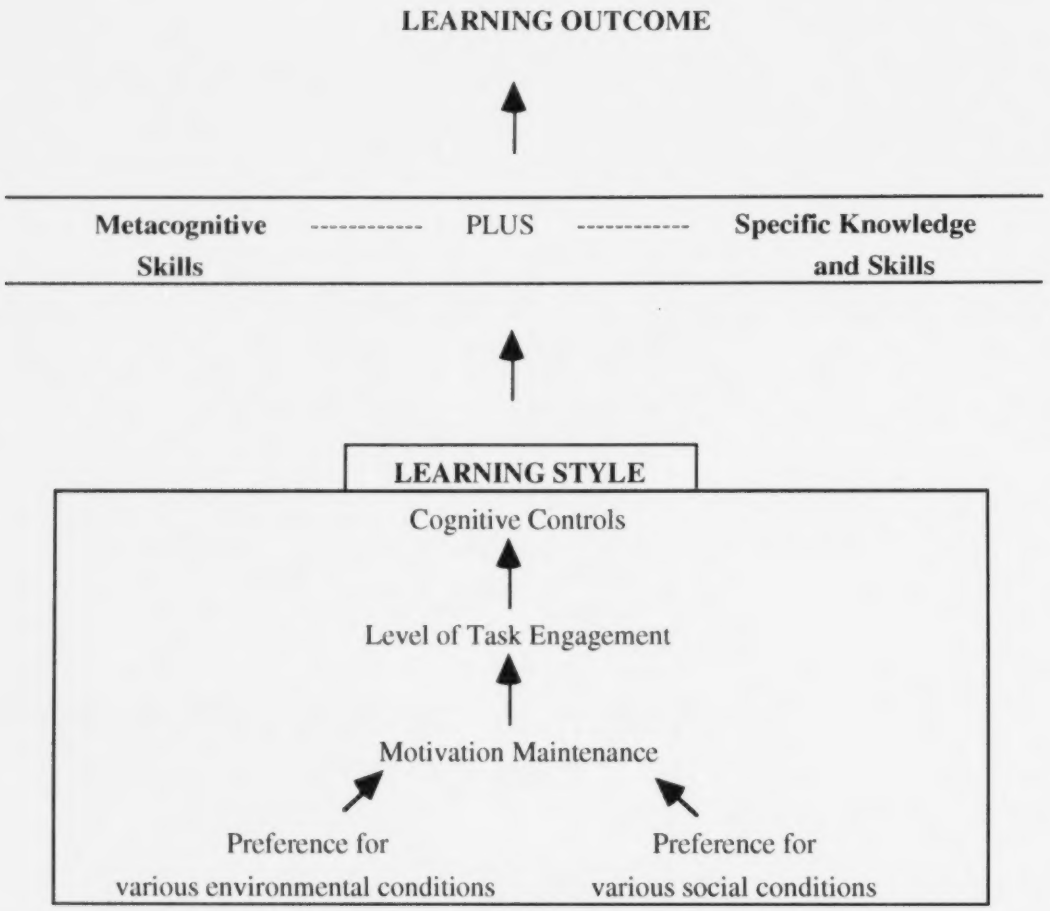

Figure 2. Learning style components as they relate to previous learning, content and learning outcome.

Note. From Learning Styles in Secondary Schools: A Review of Instruments and Implications for Their Use (p. 8) by L. Curry, 1990, Madison, WI: National Center on Effective Secondary Schools. Copyright 1983 by National Center on Effective Secondary Schools. Reprinted by permission.

cognitive personality style are still considered major learning style components, but they are linked to outcomes such as motivation and task engagement. The results of the preference, motivation, engagement and cognitive control hierarchy are the individual's learning style. A learning outcome results from the interaction between learning style, previously learned metacognitive skills, and the content.

A revised listing of learning theories is related to this new taxonomy. The outcome is that a majority of the selected learning theories relate to two or more levels in the hierarchy (Curry, 1990). However, the Myers and Briggs contribution is limited to the engagement level of the taxonomy, and Grasha's theory is restricted to the social conditions preference level. Curry's (1983a, 1990) work provides a conceptual framework and potential approaches for investigating instructional preferences as a component of learning style.

Determining Instructional Preference

Educators consider the learning environment, teaching strategies, and teaching philosophy as major learning influences for all students, including adults enrolled in post secondary institutions (Keefe, 1979b; Riechmann-Hruska, 1989; Rogers, 1986). Overall, these factors relate to the instructional preference aspect of learning style for which there are several theories and instruments. An independent review of the literature supports Curry's (1987) selection of Riechmann and Grasha; Friedman and Stritter; Rezler and French; Canfield; Dunn, Dunn and Price; and Hill as instructional preference theories. In some way, each of these theories addresses the environmental, modality, and/or interpersonal preferences of adults in teaching-learning situations. By virtue of their adult focus, they are appropriate for a post secondary setting. According to Curry (1983a), Friedman and Stritter's theory has been used with law, business, and medical students, but an extensive literature search did not reveal much additional information. Consequently, their theory will not be included in the following discussion.

Grasha-Riechmann Student Learning Style Scales (GRSLSS)

Riechmann and Grasha (1974) believed that classroom learning and student understanding could be enhanced by considering individual student characteristics. Furthermore, they postulated that teachers have a desire to innovate and consider student learning needs once they are known. However, they contended that using standardized personality tests to identify student characteristics did not readily and reliably predict classroom performance, preference for instructional format, or academic achievement. From this perspective, the Grasha-Riechmann Student Learning Style Scales (GRSLSS) was developed.

Two versions of the GRSLSS are available. The General Class Form is over-all preferences for all classes, whereas the Specific Class Form is course specific preferences. Both are self-report instruments which employ a Likert scale for items that relate to one of six dimensions: independent, dependent, participant, avoidant, collaborative, and competitive (Riechmann & Grasha, 1974; Riechmann-Hruska & Grasha, 1982). The competitive, collaborative, and participant dimensions assess the degree to which students are motivated toward interpersonal behaviors. The avoidant, independent, and dependent dimensions focus on more impersonal actions. Although the developers initially believed that the six dimensions might be three bipolar pairs or opposites, subsequent research has suggested that learners demonstrate all six dimensions to some degree. The only bipolar pair demonstrating any consistency among undergraduate college and university students is the negative participant and avoidant relationship (Andrews, 1981; Riechmann, 1974).

A mean is calculated for each dimension to determine the strength of the respondent's preference. A high mean indicates a tendency to favor the behaviors associated with the dimension. The defined characteristics relate to student attitudes toward learning, teachers, peers, and responsibilities in a classroom situation (Riechmann & Grasha, 1974). Generally the GRSLSS and its underlying theory are classified in the

social interaction category (Curry, 1990; Grasha, 1983; Riechmann-Hruska and Grasha, 1982). However, the dimensions have also been categorized as cognitive and affective according to Keefe's (1979) conceptualization of learning style (Annotated Bibliography, 1982; Ferrell, 1983). The GRSLSS test-retest reliabilities are reported as ranging from .76 to .83, and there are significant correlations between criterion items and scale scores at a .01 level of significance (Riechmann & Grasha, 1974). Factor analysis conducted by Andrews (1981) further supports the relationship between the items and the dimensions. The process used to develop and assess the construct validity of the instrument is clearly outlined (Riechmann & Grasha, 1974).

Learning Preference Inventory

Rezler and French (1975) theorized that students learn in different ways and have preferences for how they learn. They hypothesized that adjusting teaching style to students' preferences would increase motivation and maximize learning achievement. Their goals were to develop an easily understood assessment instrument that could be used to determine the processing and environmental preferences of students and practitioners in the health professions (Rezler & Rezmovic, 1981). This was reflected in the resulting Learning Preference Inventory through the items selected for the six dimensions: abstract, concrete, individual, interpersonal, student-structured, and teacher-structured (Rezler & French, 1975; Rezler & Rezmovic, 1981). Abstract and concrete items assess the preference for theoretical versus practical learning. Individual and interpersonal items investigate the preference for independence and relationships with the teacher and other students. Student-structured and teacher-structured elements explore the degree of self-direction and autonomy desired in a learning situation.

The instrument requires respondents to rank order six words or sentences for each item, and the ranks are summed to produce a score for each dimension. The Learning Preferences Inventory has both cognitive and interpersonal variables (Grasha, 1983). Rezler and French (1975) cite internal consistency reliabilities of .58 to .77 for the

Learning Preferences Inventory. More recently, Rezler and Rezmovic (1981) report internal consistencies of .58 to .88. Although there is no information about test-retest reliabilities, the methods for determining content and construct validity are outlined (Rezler & French, 1975; Rezler & Rezmovic, 1981).

Cognitive Style Mapping Inventory

Hill believed that individuals search for meaning in an individualized way through their orientation to symbolic forms, their personal experiences and their ways of reasoning (Lange, 1979; Warner, 1982). He also supported the diagnosis and treatment of individual learner differences and the management of the learning environment (Warner, 1982). As a consequence, he developed Cognitive Style Mapping which uses an inventory approach to identify symbols and their meanings, cultural determinants, and modalities of inference that are unique to the learner and could impact on the teaching-learning situation (DeBello, 1989; Strother, 1982; Warner, 1982).

Hill's original inventory has undergone several revisions and there appears to be no published, standard version (Bonham, 1988; DeBello, 1989). The Cognitive Style Mapping Inventory is a general learning style instrument which is credited with cognitive, interpersonal and environmental components (Annotated Bibliography, 1982; Grasha, 1983). An extensive literature review did not reveal information about the validity and reliability of the original Hill instrument. Furthermore, references such as Cranston and McCort (1985) and Lange (1979) do not provide validity and reliability information for their versions of Hill's Cognitive Style Mapping Inventory.

Productivity Environmental Preference Survey (PEPS)

Another group of theorists taking a direct diagnostic-prescriptive approach was Dunn, Dunn, and Price who drew on psychological and educational research for their model. According to them, "each individual has a biological and developmental set of learning characteristics that are unique" (Price, Dunn & Dunn, 1991, p. 21). Furthermore, they contend that the uniqueness is measurable, and the results can be used by the learner

and/or the teacher to increase motivation, learning, and productivity. Consequently, Dunn, Dunn and Price developed the Learning Style Inventory (LSI) for individuals in grades 3 through 12, and the Productivity Environmental Preference Survey (PEPS) for adults (Dunn, 1982; Price, 1982). Through the items on the PEPS, twenty elements that commonly influence functioning, learning, concentration and performance in an educational or occupational situation are analyzed (Price, Dunn & Dunn, 1991). The elements are used to evaluate environmental needs (sound, light, temperature, and design elements); emotional needs (motivation, persistence, responsibility, and structure elements); sociological needs (orientation toward self, peer, and/or authority); and physical needs (perceptual, intake, time, and mobility elements). Preferences are reported by the respondent on a Likert scale which yields raw and normalized scores that reflect the degree to which the element is important. The PEPS is a general learning style instrument which is credited with environmental, emotional, sociological, physical, and psychological components (Annotated Bibliography, 1982; DeBello, 1989). The reliabilities for the PEPS are reported as .39 to .87, and the quality of the scales has been confirmed by factor analysis (Price, Dunn & Dunn, 1991). Face and construct validity procedures are less clearly explained.

Student Learning Style Survey (SLSS)

The Student Learning Style Survey (SLSS) developed by the Murdock Teaching Center, under the auspices of the Wichita Public Schools, is based on the work of Dunn, Dunn, and Price (Friedman & Alley, 1984). The SLSS is a 45-item paper and pencil inventory which assesses self-reported preferences for functioning, learning, and performing, during educational activities. Students rate statements concerning modality and social interaction as being most to least like themselves, using a four point Likert scale. The numbers associated with selected responses are totaled and multiplied by two to produce a score in each of nine areas: visual language, visual number, auditory language, auditory number, combination of auditory/visual/kinesthetic, individual

learning, and group learning. Although the Murdock Teaching Center is no longer operating, a former educator at the center confirmed that this instrument was used extensively, but no reliability and validity findings are available (P. Burdine, personal communication, November 2, 1992).

Learning Styles Inventory

Rational thought provided the basis for Canfield's diagnostic-prescriptive model which investigates the motivational components in the learning situation (Canfield, 1992). According to Canfield (1992), the Learning Styles Inventory assesses a learner's motivation through items that relate to conditions for learning, area of interest, mode of learning, and expectation for course grade. Conditions for learning examines the degree of structure and the type of relationships preferred during instruction. Area of interest considers the preference for working with numbers, words, things, or people. Mode of learning identifies the modality preference for obtaining new information. Expectation for course grade determines the anticipated level of performance.

This self-report inventory utilizes a ranking scale which is scored to create a learner profile and typology. The Canfield Learning Styles Inventory is a general learning style instrument in that it contains cognitive, interpersonal, and environmental variables (Annotated Bibliography, 1982; Grasha, 1983). The Canfield Learning Style Inventory Manual quotes comparative item reliabilities ranging from .86 to .97 and split-half scale reliabilities of .96 to .99 (Canfield, 1992). However, no test-retest reliabilities are reported and the processes used for determining validity are not discussed.

Critique of Instructional Preference Instruments

Among investigators conducting critical comparisons of learning style instruments, there is widespread consensus that all instruments have shortcomings and demonstrate low to moderate reliability and validity (Blakemore, McCray & Coker, 1984; Bonham, 1988; DeBello, 1989; Ferrell, 1983; Rule & Grippin, 1988; Sewall, 1986). This perception is confirmed by the available information for the six instructional preference

instruments previously discussed. The reported internal consistency, test-retest reliability, and validity are strongest for the GRSLSS, PEPS, and Learning Preferences Inventory. These are the same instruments identified by Curry (1983a, 1987) as demonstrating sufficient psychometric reliability and validity to be recommended for use. She does not recommend the instruments developed by Canfield and Hill in the belief that they lack data to support the validity and reliability of the measure proposed.

There are several reasons why the GRSLSS, PEPS, and Learning Preferences Inventory would be appropriate for this research. The first reason is that they have been previously employed in studies sampling nursing populations (Cranston & McCort, 1985; LaMothe et al., 1991; Linares, 1989; Loesch & Foley, 1988). Secondly, each contains items that assess interpersonal factors relevant to learning preferences. Furthermore, each of these instruments utilizes a self-report format through which instructional preferences can be expressed. The Learning Preferences Inventory uses ranking, an ipsative measure, which is concerned with the relative strengths of categories within an individual. The other instruments use a Likert scale more compatible with assessing the degree to which a characteristic exists, and more conducive to between group assessments. To answer the questions posed for this study, a Likert scale is required. Consequently, of the three instructional preference instruments in question, the reporting format of the PEPS and GRSLSS would be most appropriate for this study.

The GRSLSS is not available commercially, but it is available from Dr. Grasha, accompanied by a key for hand scoring. Unlike the GRSLSS, the PEPS must be purchased commercially and scored by the company. The results are reported according to a developer-determined format which cannot be modified. These procedures restrict the researcher's data input, analysis, and reporting options for the PEPS. According to printed material from the publisher, the cost of scoring the PEPS varies with sample size and ranges from $0.95 to $4.00 each. The cost of group statistics ranges from $5.00 to $7.50. In addition there is a sliding scale for the answer sheets with 10 sheets costing

$2.50, and 500 sheets costing $34.00. Non-reusable computer software, for I.B.M., Apple, and Macintosh hardware, is available for $295 for the first 100 subjects and $60.00 per 100 subjects thereafter. All of these quotes are in American funds, and there is a discount for students doing research. Since the GRSLSS can be printed and scored by the researcher, there are no purchase or mailing costs and there is no risk of losing response sheets in the mail. Therefore, with regard to administration and scoring, the GRSLSS is cheaper and provides more flexibility than the PEPS.

Furthermore, the GRSLSS focuses primarily on the interpersonal component of instructional preference so that all of its dimensions and assessment items are appropriate for this research. By comparison seven of the twenty areas investigated by the PEPS are relative to social preferences. The seven areas appropriate to this study are motivation, persistent, responsible, structure, peers, authority figures, and several ways. Since the PEPS requires modifications, which are not permitted by the developers, students would be required to complete unnecessary items if this instrument was used. Overall, the GRSLSS satisfies the requirements of this investigation of instructional preferences more satisfactorily than the other five instruments.

Nursing Students as Post secondary Students with Instructional Preferences

Nursing programs are undertaken by students as post secondary education. Therefore, it is reasonable to expect nursing students to demonstrate demographics, roles, and instructional preference patterns similar to other post secondary students. Although this assumption ignores the existence of discipline variations, it does provide a mechanism for obtaining necessary guidance and direction for educational practices. Consequently, instructional preference literature pertinent to both post secondary education and nursing are appropriate to this study.

Post secondary Students and Instructional Preferences

Three features of post secondary education have implications for the instructional preferences of the student population. Firstly, there are several general characteristics

that could be considered typical of post secondary students (Cross, 1981; Davis, 1990; Nordstrom, 1989; Rogers, 1986). For example, post secondary students vary in age and are adult in that they demonstrate full development, perspective, and autonomy (Rogers, 1986). As adult learners, they are assumed to be fully developed physically, capable of making mature judgments about themselves and others, and seeking self-direction and independence. Furthermore, they have previous experiences and values, and are continuing with lifelong learning in that they are continuing a growth process rather than starting one. Post secondary students have educational goals and expectations about the learning process, and they have pre-existing ways of reacting to learning situations. Lastly, adult students have other interests and responsibilities that are competing with their education. Each of these characteristics has implications for student preferences, perceptions, and needs in a teaching-learning situation.

The second feature of post secondary students is that they assume learner roles which may be determined by their need for social interaction, peer support or guidance, and teacher direction (Endorf & McNeff, 1991). Accordingly, students may be described as confident and goal-oriented learners, affective learners who enjoy the "feeling" of school, learners-in-transition, integrated learners, or risk-taking learners. There is a relationship between each of these roles and the social conditions associated with instructional preference.

Thirdly, post secondary education is non-compulsory and not restricted to a particular period in the life span (Huyck & Hoyer, 1982; Schaie & Willis, 1991). Consequently, the demographic profile of post secondary students is susceptible to constant change as it reflects the alterations in learner circumstances, opportunities, and requirements. For example, in 1990-91, there were more students aged 18 to 25 years than students over 25 years enrolled in Canadian colleges and related institutions (Statistics Canada, 1993). However, there was a steady increase in older students and a decline in students under 20 years during the preceding decade. Consequently, the

average age of college students is rising. Furthermore, the number of women enrolled in post secondary programs increased, reaching an all time high in 1990-91. By comparison, male enrollment peaked in 1984-85 and declined thereafter.

Although previous age and gender findings concerning instructional preference were inconclusive, they did support a relationship between student profiles and instructional preferences. For example, studies suggest that learning style is influenced by age and experience, with the greatest differences occurring between 18 and 24 years, and after age 55 (Dunn, DeBellow, Brennan, Kromsky, & Murrain, 1981; Price, 1987; Ramsden, 1988). In 1987, Price found that younger students prefer working alone and like an authority figure present, whereas older students like structure but are more interpersonal. According to Riechmann-Hruska and Grasha (1982), students over 25 are more independent and participatory than younger students who tend to prefer less interactive behaviors. However, more current norms with the same assessment instrument suggest that independence increases with age, participation and classroom interaction decrease with age, and collaboration and dependence vary inconsistently among age groups (Grasha, 1990). The literature also suggests that gender may influence preferences for some learning style elements such as working with others and preferring that an authority be present (Price, 1987). By comparison, Loesch and Foley (1988) found that age and gender were not related to learning preferences. In conjunction with changing demographic trends, learner experiences, needs, demands, issues, skills, and expectations may alter. Consequently, the previous findings may no longer be well-grounded.

Similarly, there are other findings about the learning style and instructional preferences of college and university undergraduate populations that may no longer be valid. For example, Andrews (1981) reported post secondary students as having learning preferences that were more interpersonal than impersonal, and more collaborative than competitive. Previous research also reported that students prefer certain learning

approaches and environments and will resist changing them, but they are capable of modifying existing patterns and learning new behaviors more appropriate to the task and circumstances (Dunn, Beaudry & Klavas, 1989; Gregorc, 1979; Henson & Borthwick, 1984; Schmeck, 1982).

Although it can be argued that instructional preference data need to be updated because of changing student profiles, there are other rationale for considering this a worthwhile endeavor. It is generally acknowledged that students' instructional preferences are important to consider when planning educational experiences (Cornett, 1983; Dunn & Griggs, 1988; Grasha, 1983; Rule & Grippin, 1988). For example, Kirby (1983) contends that group efforts are enhanced when individuals with different styles work together. Other research suggests that performance, as measured by evaluation of content learning, improves when students' instructional preferences are considered during the teaching-learning experience (Dunn, Beaudry & Klavas, 1989). Classroom procedures and students' instructional preferences are believed to influence the development of the students' interpersonal and organizational skills (Grasha, 1972). Research also confirms that adult students tend to choose courses more compatible with their learning style (Andrews, 1981; Loesch & Foley, 1988). Furthermore, there is evidence to support that positive learning outcomes are more likely to result if instructional preference and circumstances are congruent (Hodges, 1988; Linares, 1989; Newble & Entwistle, 1986). On the other hand, if students habitually utilize only one learning style, they could be disadvantaged when confronted with the need to use a different mode (Garity, 1985; Partridge, 1983).

Notwithstanding the importance of determining student' instructional preferences, it is generally accepted that the teacher has the responsibility for determining the students' instructional preferences and establishing the learning environment (Orr, 1991; Schmeck, 1988; Tiberius & Billson, 1991). Often this task is undertaken without formally determining the learning preferences of the student so that faculty members are unaware

of the congruency between their choice of teaching strategy and the students' preferences (Riechmann-Hruska & Grasha, 1982). A formal versus an informal determination of students' preferences is recommended for several reasons (Schmeck, 1988; Shores, 1985). One reason is that obtaining sufficient information about student learning characteristics through informal observation is difficult, because of inadequate teacher preparation, experience, or opportunity (DeBello, 1989). Secondly, to maximize benefits the instructional preference information should be shared with students and educators and this requires structure and organization (Duckwall, Arnold & Hayes, 1991; Henson & Borthwick, 1984; Riechmann-Hruska, 1989).

Overall, the reviewed literature supports the identification and utilization of learning style as a concept, and instructional preference as an applicable perception component, in a post secondary situation. However, several researchers point out the influence of previous experience, role, and developmental level on learning preferences. There is no question that these factors can induce change in preference, but it is unclear if the change occurred within the individual or as a result of development in ability to adapt (Price, 1982).

Nursing Students and Instructional Preferences

It is generally agreed that student nurse profiles mirror the demographic changes of post secondary students. For example, over the past thirty years, there has been a slow rise in the number of males entering the female dominated nursing profession in Canada (Okrainec, 1986; Statistics Canada, 1992). Informal observations suggest changing age profiles of students nurses, but this could not be confirmed with available published data. Nursing literature acknowledges that age, gender, personal needs, expectations, and previous learning may potentially affect new learning situations in which student nurses find themselves. However, there is a lack of supporting empirical data and no instructional preference norms are available for nursing populations. This circumstance is consistent with what Nordstrom (1989) and Sewall (1986) describe as a dearth of large representative norms for adult learners, especially those in the professions. This deficit

also requires that nurse educators rely on post secondary and adult education research which has not been validated with nursing populations and may be outdated.

According to the literature, nurse educators identify the attributes they seek in their students as a goal or a predisposition, but they are less inclined to formally assess their presence. For example, nursing education programs strive toward a goal of assisting students to be "independent, professional nursing practitioners who are self-directed, lifelong learners" (Merritt, 1989, p. 14). Being self-directed and independent are perceived as important learner attributes (Beeman, 1988). According to Bevis (1989b), education should be encouraging responsibility, working with others to seek solutions, cooperation, discussion, initiative and self-reliance. Furthermore, she perceives collaboration with teachers and fellow students as germane to the worthwhile processes of questioning and maturing. This participatory quality is also described as one of two desirable features of innovative learning by Clayton & Murray (1989). One way of assessing the degree to which these attributes exist is by determining the social conditions students prefer during instruction. Since this type of empirical assessment is rarely reported, the presence or absence of desired qualities remains supposition.

Similarly, educational institutions consciously or unconsciously implement a learning theory and philosophy which influence the definition of learning, the teacher's role, the approach to teaching and learning, and the challenge to the learner's capabilities. Some nurse educators believe that nursing programs should be moving toward a humanitarian philosophy as opposed to a behavioral philosophy of education (Bevis & Murray, 1990; Diekelmann, 1990). With a humanistic approach, the emphasis is on emotional elements, interpersonal skills, and self-awareness. There is freedom to explore, and students learn how to learn. The degree to which this approach can be undertaken will be affected to some extent by the students' learned or inherent social predispositions which may be measured, at least in part, through instructional preference assessments. However, the majority of the learning style studies in nursing are based on

the Kolb theory which focuses on the information processing component of learning style.

In the classroom, nurse educators tend to assume that students have the necessary congruent preferences for the teaching strategy that has been selected. However, each teaching-learning strategy requires different personal and interpersonal characteristics from learners (Bevis, 1989a; de Tornyay, 1984; de Tornyay & Thompson, 1987). Furthermore, nurse educators have several strategies from which to choose: lecture, seminar, laboratory, independent study, group presentation, learning packages, and clinical practice (de Tornyay & Thompson, 1987). Currently, problem-based learning is gaining popularity in schools of nursing. Without some form of structured assessment, there is no way of determining the congruency between the students' interpersonal preferences or skills and the demands of the situation. Therefore, the legitimacy of the instructional assumptions are questionable.

Although student nurses are the most frequently studied group of health professionals with regard to the learning style construct, little is known about their learning styles and instructional preferences (DeCoux, 1990; Wells & Higgs, 1990). In part, this may be due to the use of inconsistent theoretical approaches to learning style and the use of dissimilar instruments to measure the construct. Furthermore, the majority of the nursing research on learning style focuses on information processing or cognitive personality assessment (Haislett, Hughes, Atkinson & Williams, 1993; Katz & Heimann, 1991; King, 1988; Laschinger, 1986; Laschinger & Boss, 1989).

The studies that do use instructional preference assessments often do so in a comparative or predictive context. For example, there are studies to investigate correlations between preference and type of program or academic achievement (Cranston & McCort, 1985; Linares, 1989; Remington & Kroll, 1990). Other research determines the relationship between learning preferences and clinical or classroom teaching style (Harvey & Vaughan, 1990; O'Kell, 1988). This relationship is further explored to

determine differences between traditional and post RN baccalaureate students (LaMothe et al., 1991; Linares, 1989; Loesch & Foley, 1988; Merritt, 1983). There are also studies comparing nurses with other health professionals to explore the relationships between learning styles and career choices (Rezler & French, 1975). Each of these studies was conducted with American or British student nurses, and an extensive literature review did not reveal comparable studies of the instructional preferences of Canadian students. The degree to which these previous research findings reflects the current situation in Canadian nursing programs is unknown. Overall, the findings concerning instructional preferences of nursing students are limited, inconclusive, and based on other than Canadian nursing populations.

Summary

According to the literature reviewed in this chapter, learning style is a concept characterized by inconsistent terminology and theoretical approaches to explain its interrelationship and components. The controversy over components of the learning style construct has resulted in several theories and measurement instruments. The outcome is inadequate data to support correlational and experimental studies about learning style (Curry, 1983a; Keefe, 1982). The conceptual frameworks proposed by Curry (1983a; 1990b) provide a potential mechanism for organizing current learning style theories and their assessment dimensions. According to these frameworks, several theories are appropriate to the investigation of the instructional preference aspect of learning style. However, the GRSLSS was the instrument of choice for this research.

The literature also supports the importance and relevance of assessing learning style components with regard for the current situations and trends in undergraduate education, generically and with specific reference to nursing programs. Although the literature identifies potential benefits, there has been limited research based on an information processing theory. Furthermore, the data that are available were obtained from populations in situations that may or may not correlate with those currently found in

Canadian schools of nursing. Consequently, there is a lack of basic data concerning instructional preferences of Canadian nursing students. The methodology implemented to obtain data relevant to the aforementioned deficit will be discussed in the next chapter.

Chapter Three

Methodology

It is generally agreed that students undertake nursing programs with different and diverse experiences, characteristics, values, expectations, and personal situations that impact on learning style and the learning process (Cross, 1982; Davis, 1990; Rogers, 1986). One approach to investigating learning style is to consider instructional preference (Curry, 1983a). Instructional preference is a component of learning style that has potential practical application to the teaching-learning situation, especially with regard to interpersonal and control conditions. However, a review of the literature revealed that there was little information about the instructional preferences of nursing students. In response to this deficit, the current study was undertaken to identify student nurses' perceived instructional preferences and to identify significant relationships and differences among them.

To insure that the identification was based on sound data, a research design, procedures, and respondent group were selected. These are the focus of this chapter. The chapter begins with a discussion of the study's design and subject group. This is followed by a description of the data collection method. Lastly, procedural and ethical components are elucidated.

Design

This study was conducted using a non-experimental, quantitative, cross-sectional research design to inquire into the interpersonal and control components of instructional preferences. According to Brink and Wood (1989), this approach was appropriate to the purpose of the study for several reasons. One reason was that the literature and common sense supported the existence of such information in a student nurse population. Secondly, there were no data dealing specifically with the study population, and indeed there were limited data based on Canadian student nurses. Thirdly, although instructional

preference and information processing are both considered components of learning and learning style, most previous research has focused on the latter. Fourthly, the perceived instructional preferences of a diverse group of students could be identified by using an available instrument and administering it once.

Subjects

Study Setting

The study was undertaken with subjects from the collaborative nursing program initiated in Edmonton, Alberta, Canada, in September, 1991. This new four year baccalaureate program was developed through the collaboration of the University of Alberta Faculty of Nursing with the University of Alberta Hospitals School of Nursing, Royal Alexandra Hospital School of Nursing, Misericordia Hospital School of Nursing, and Grant MacEwan Community College Health Sciences Division. When this research was conducted, the University of Alberta Hospitals was a hospital school maintaining a joint relationship with the University of Alberta Faculty of Nursing. The Royal Alexandra and Misericordia were hospital based schools of nursing, and Grant MacEwan was a college based program.

The students enrolled in the collaborative program were participating in a new curriculum composed of courses specifically developed for it. The four participating schools offered the same courses during the first two years of the program. At the conclusion of the second year, students continued with the third and fourth years of the collaborative baccalaureate program offered through the University of Alberta or they enrolled in the six month diploma exit program at a participating school of nursing.

Study Population

The target population for this study was students who had enrolled in the collaborative nursing program in September 1992 and were participating in nursing classes between January and April, 1993. At the time of data collection, there were 438 such first year students eligible for participation: 182 students enrolled in the University

of Alberta Hospitals School of Nursing, 102 in the Royal Alexandra Hospital School of Nursing, 67 in Grant MacEwan Community College Health Sciences Division, and 87 in the Misericordia Hospital School of Nursing. Data collection occurred in conjunction with regularly scheduled nursing classes that all students required, so that all entrants in the 1992 program could be invited to participate.

Number of Subjects

Although the subjects in this study were a population, rather than a sample, an acceptable participant minimum was established. Based on a 100% response rate, Gower and Kelly (1988) suggested a sample size of 200 to 222 for a population of 400 to 500 with a 95% confidence level and a ±5 % margin of error. To increase the possibility of significant findings, this number was increased slightly so that 260 students was considered a minimum acceptable number of respondents for this study.

The majority of students who received information about the study were willing to participate. From a total of 335 students attending the classes during which data collection material was circulated, 287 students chose to participate in this study. In other words, 65.5% of the target population participated. Several considerations may account for the discrepancy between total student enrollment and the number of packages that were circulated. In one institution, data were collected on the last class day prior to a long week-end, and student attendance was low. In another situation, some students, uninformed of the upcoming meeting with the researcher, left the classroom when the scheduled class concluded earlier than usual. Since it was impossible to re-schedule a future meeting with this student group, the data collection proceeded with the remaining students. In all cases, the class schedules were very full, and there were some difficulties arranging appropriate times when the students could be accessed without disrupting presentations and other planned activities.

Of the 335 questionnaires circulated, 235 were distributed under circumstances where they could be immediately completed and returned. In this situation, 234 were

returned, resulting in a 99.57% return rate. By comparison, 100 questionnaires were circulated with a verbal explanation, but under circumstances that required their completion and return outside of the classroom setting. The 54 returned questionnaires constituted a 54% return rate.

Data Collection Instruments

Description

Participants in this study completed two data collection instruments. The General Class Form of the Grasha-Riechmann Student Learning Style Scales (GRSLSS) was one of the instruments selected for use (see Appendix A for sample). The GRSLSS is a 60-item paper and pencil Likert scale inventory which assesses self-reported adult preferences for interacting with teachers, other students and learning content. The assessment is expressed as a score for each of six dimensions: independent, dependent, participant, avoidant, collaborative, and competitive. To supplement the questionnaire, there is an accompanying explanation of relevant behaviors and activities associated with each dimension (see Appendix B). The competitive and collaborative scales evaluate the degree to which a student is motivated to interact and assume responsibility for sharing ideas and talents in a learning situation. The avoidant and participant scales explore a student's preference for the interactions and control associated with a traditional classroom. The independent and dependent scales assess the interpersonal and control circumstances the student desires to support intellectual curiosity and initiative.

In addition, the behaviors associated with each dimension may be categorized as being predominantly impersonal or interpersonal (Andrews, 1981). The dependent, participant, and collaborative dimensions evidence more interpersonal components and preference for authority involvement. Conversely, the independent, avoidant, and competitive dimensions are characterized by impersonal activities with limited authority and interpersonal involvement.

Utilizing a 5-point Likert-type scale, students were asked to express degrees of agreement or disagreement with the ten self-descriptive statements for each of the six dimensions on the GRSLSS. The task was completed in 10 to 20 minutes. The responses were numerically coded with values ranging from one for strong disagreement through five for strong agreement. Dimension scores were calculated as means which varied from a minimum of one to a maximum of five. Higher means were interpreted as indicating a greater agreement with the behaviors associated with the dimension.

The second data collection instrument was a self-report questionnaire developed by the researcher with reference to the Nursing Student Questionnaire developed by the Collaborative Evaluation and Research Committee. The resulting Demographic Data Questionnaire was used to obtain information about the subjects: age, gender, marital status, number of dependents, pre-admission academic achievement, and intended completion program option (see Appendix C for sample). Furthermore, this questionnaire was used to collect data concerning instructional strategies and completion program of choice, factors that could influence the study findings. Students completed this questionnaire in an average of 5 minutes.

Reliability and Validity

The GRSLSS had been used in research and there was support for its reliability and validity. Furthermore, the process implemented for item selection during the development of the GRSLSS reflected construct validity (Riechmann & Grasha, 1974). The developers cited a large number of meaningful significant correlations between criterion items and scale scores. Test-retest reliabilities used a seven-day interval. During the initial development of the GRSLSS, the number of items per scale was increased from eight to 15. The resulting correlations ranged from .81 to .89 for 119 males and from .73 to .82 for 150 females, with coefficients ranging from .76 to .82 for the total sample of 269 undergraduate college students (Riechmann & Grasha, 1974). Specifically, the reliability coefficients for males were: Independent, .84; Avoidant, .82;

Collaborative, .81; Dependent, .81; Competitive, . 84 Participant, .89. The coefficients for females were: Independent, .82; Avoidant, .76; Collaborative, .78; Dependent, .73; Competitive, .81; Participant, .74. The total group coefficients were: Independent, .83; Avoidant, .79; Collaborative, .80; Dependent, .76; Competitive, .82; Participant, .82.

After assessing the developers' reported findings, Curry (1987) considered the validity and reliability of the GRSLSS sufficient to support its use as a learning style measurement. In her review, she cited test-retest correlations of .76 to .83 with an average of .80, and internal consistency correlations ranging from .39 to .76 with an average of .60 as determined by the Kuder-Richardson 20 test (Curry, 1987). Ferrell (1983) reported limited factor analysis support for the construct validity of the GRSLSS, in that it represented a conceptualization of the learning style that was limited to cognitive and affective behaviors. According to the factor analysis conducted by Andrews (1981), 82% of the scale items loaded positively and significantly on the expected dimension. All of these data were based on the 90-item instrument resulting from the initial development.

As an outcome of Dr. Grasha's continued administration of the instrument to college undergraduates and his statistical analyses of the results, the GRSLSS has been shortened to 60 items (T. Grasha, personal communication, June 5, 1993). The reliability and validity of the GRSLSS with this study's population were addressed in several ways. Reliability was assessed using Cronbach's alpha to determine the internal consistency of items in each dimension. Face validity was assessed by three expert nurse educators who were asked to accept or reject the items for each dimension according to their appropriateness (see Appendix D for sample). The experts were selected by the researcher on the basis of their academic background in education and their experience as nurse educators in a classroom and clinical environment. One expert considered all of the GRSLSS items to be appropriate. A second expert identified six inappropriate items, at least one in each of three dimensions: independent, avoidant, and participant. The third

expert identified twelve inappropriate items, at least one in each of the six dimensions. The experts agreed on the inappropriateness of only two items in the avoidant dimension. These items related to studying just hard enough to get by, and typically cramming for exams, questions 38 and 44 on the GRSLSS. Based on the researcher's journal entries and recollections, there were no verbal or written comments from subjects to indicate that they had problems with these or any of the items on the GRSLSS. Since the expert reviews were inconclusive, the instrument was not modified and data analysis was not revised as a result of the feedback.

Coding Used for Responses

The responses to the items on the GRSLSS were coded as a number between one and five. Strongly disagree responses were coded as one, moderately disagree as two, undecided as three, moderately agree as four, and strongly agree as five. With the exception of items one and six, the information on the Demographic Data Questionnaire was coded according to the number of the selected response (see Appendix E for sample of data coding). Item one was recorded as the actual age. For item six, unchecked experiences were coded as zero, and those that were checked received a coding of one.

Rationale for Selecting Instrument

Five other instruments were considered for use with, or as alternatives to, the GRSLSS. One instrument assessed for this study was the Productivity Environmental Preference Survey (PEPS), developed by Dunn, Dunn, and Price. Although there was acceptable reliability and validity for this instrument, it was eliminated on the basis of modification, item scoring, reporting, and cost concerns. Since some of the items on the PEPS related to preferences other than social interaction and control, they could have been excluded. However, the instrument must be purchased and used without modification or deletions, so students would have been required to respond to unnecessary items. With regard to scoring, unless a computerized scoring program is purchased, response sheets have to be forwarded to the marketing company for

processing, a procedure with associated cost and loss considerations. In addition, the Hoyt determination of the instrument's reliability and validity for the study's population has to be completed by the marketing company. There is no reason to doubt the accuracy of the resulting data, but, conversely, there is also no way to confirm the findings. Furthermore, findings unrelated to this study are reported according to a developer-determined preference profile.

Canfield's Learning Styles Inventory was the second instrument evaluated for use in this study. However, it was not selected for three reasons. Firstly, the cost was prohibitive. Secondly, it used a ranking scale which precluded the quantification of data. Thirdly, only one of the four areas it assessed was appropriate to this study.

The Student Learning Style Survey, developed by the Murdock Teaching Center under the auspices of the Wichita Public Schools, was the third instrument contemplated for use. However, extensive efforts to locate information concerning reliability, validity, norms, and studies using the instrument, were unsuccessful. The copyrighted computer version was located, but it required a purchase fee. Since the establishment of the reliability and validity of the instrument could be the focus of an entire research investigation, the use of this instrument was considered to be beyond the scope of this study.

The Learning Preference Inventory developed by Rezler and French was the fourth instrument evaluated. This instrument was not selected for three reasons. Firstly, it used ranking which limited analysis to non-parametric procedures. Secondly it did not provide information concerning the degree of preference. Thirdly, two of the dimensions, abstract and concrete, related to information processing and not instructional preference.

Finally, Hill's Cognitive Style Mapping was considered for the research. This inventory has undergone several revisions and there did not appear to be a published, standard version. Furthermore, an exhaustive search did not reveal any reliability and

validity findings. Lastly, although the instrument contained some interpersonal and control items, this was not its main focus.

The researcher had an opportunity to administer the PEPS and GRSLSS to selected second year nursing students, who would not be participating in the study, in conjunction with their teaching and learning course in September, 1992. Consequently, the researcher had an opportunity to assess the questionnaires and their findings. Specifically, cost, ease of use, time demands, and direction clarity were evaluated for each questionnaire. Furthermore, computer programs that could be used for student feedback and data analyses were explored.

The choice of a learning style instrument is determined by the requirements of the specific situation, the intended purpose, the instrument's validity and reliability, and the cost and time demands associated with administration and interpretation (Blakemore et al., 1984; Bonham, 1988; Brink & Wood, 1989). Consequently, the GRSLSS was selected for several reasons. It provided a mechanism for identifying the instructional preferences of student nurses, with the understanding that reported preferences may not be congruent with actions and that respondents may make and/or report inaccurate judgments about themselves. Furthermore, its major focus was interpersonal and control preferences, so the instrument required no modifications or the completion of unnecessary items. Adult norms, based on undergraduate college subjects, were available for comparison with study group results. There was reported validity and reliability data which were acceptable. The GRSLSS employed a Likert scale which permitted the use of between group statistical analysis. Data input and analysis could be controlled by the researcher. Furthermore, the instrument was simple, easily completed in a short time, and inexpensive to administer and score. The researcher's personal experiences with the instrument suggested that the ease of use and short completion time would impact positively on a student's decision to participate in the study.

Procedure

For Ensuring Rights of Subjects

Prior to beginning the formal research study, the proposal was presented to the Ethics Review Committee for the Faculty of Nursing at the University of Alberta for review and approval. Thereafter, the proposal was submitted to the Administrative Council for the collaborative program (see Appendix F for protocol). Subsequent to the approval of the Collaborative Evaluation and Research Review Committee, and the Administrative Council's permission, the Directors of the individual schools were approached concerning access. In addition, the proposal was circulated to the Office of Institutional Research and Planning at Grant MacEwan Community College for approval. Contingent on the proposal's evaluation according to each institution's protocol, the Directors provided written permission to access first year students and identified a contact person through whom arrangements could be finalized.

Student participation was voluntary, and obtained through informed consent. Instructors from the school were not present in the room when students made the decision to participate. Subjects received written and verbal information about the study when the researcher introduced the study to each group. Packages, circulated to the subjects at the beginning of the session, contained copies of the consent which included the name and phone number of contact persons and the terms of the agreement. In addition, a script was used by the researcher to verbally stipulate the nature and purpose of the study, how it was being monitored, how collected data would be used, and what was expected from subjects. Subjects were given an opportunity to read information prior to signing the consent, and their questions were answered. According to the Flesch-Kincaid analysis, the consent had an 8.9 grade reading level. Participants were informed that they could withdraw at any time prior to the analysis of the data by notifying either of the contact persons named on the consent. Risks to the participant were minimal to non-existent.

The researcher and the researcher's supervisor were the only individuals who had access to all of the actual data. In addition, participants had access to their own, through the personal instructional preference profile which was forwarded to them at the conclusion of the study. Identification numbers were used for all data collection and its' computer input, and findings were reported as group results. All material related to this study was handled in a confidential manner and retained in a locked cupboard when not in use. Other than consents, no record of names was retained. Consents were kept separate from data.

For Maintaining Constancy

All of the study's data were collected by the researcher during a three week period in February and March, 1993. To insure that all eligible students had an opportunity to participate, arrangements were made so that the data collection packages were circulated to all sections of a selected nursing course in each institution. Consequently, packages were circulated in conjunction with the pharmacotherapeutics course at three institutions, and in association with the growth and development course at the fourth. To contact students in all of the sections of these courses, twelve classes were attended. The course during which students were accessed was determined according to timetable constraints and the unanimous cooperation of the instructors from all course sections. Similarly, these factors influenced whether the questionnaires were circulated for immediate completion and return, or circulated for completion and return at a later time.

Packages of data collection material, prepared for each participant, contained two consent forms, plus copies of the GRSLSS and the Demographic Data Questionnaire (see Appendix G for consent sample). There were two consent forms so the subject could retain one copy for future reference. To facilitate the return of individual profiles, they also contained coded index cards on which the students printed their names. In situations where the questionnaires were returned at a later date, package contents were supplemented with written guidelines and an envelope (see Appendix H for guidelines).

After the packages were circulated, the contents were verbally identified and explained according to the accompanying script (see Appendix I for script contents). Although there was no time limit, students generally completed the package contents in 15 to 25 minutes. In eight classroom situations, consents, responses, and index cards were immediately completed and returned to the researcher. However, in four situations, students were directed to return completed material to the school receptionist, sealed in the provided envelopes.

There were 288 completed packages returned for analysis. Although a consent was signed, the data from one package were omitted because the Demographic Questionnaire was not completed and the second questionnaire was incomplete. Consequently the findings for this study were based on data from 287 participants. All instrument coding and computer input were performed by the researcher.

For Investigating Data

The researcher completed all data analysis in consultation with computer experts as required. The responses obtained on the GRSLSS and Demographic Data Questionnaire were entered into the computer according to the Systat statistical program, and subsequent analyses were conducted using Macintosh versions of the Systat or SPSS programs. Data input were cross-checked by comparing computer print-outs of coded responses against questionnaire responses. Frequencies were obtained for all of the questionnaire items on the instruments to insure that valid and missing cases tallied. Thereafter, responses were statistically analyzed to determine participants' characteristics, assess instrument reliability and validity with this population, and determine subjects' instructional preferences.

In this study, the demographic variables were nominal so they were investigated as frequencies and proportions. However, age was reported as ratio data and converted to nominal categories. Consequently, mean, standard deviation, range and median were also reported for age. Since dimension scores were calculated as means, inferential statistics

were used to determine significant relationships and differences between them. Analysis of variance, multivariate analysis of variance or t-tests were used for the former, and the Tukey HSD post hoc test was used for the latter. The instrument's reliability was determined through Cronbach's alpha. Demographic variables, personal circumstances, and previous experiences with instructional strategies were explored as coincidental moderating factors for dimension results. The chi-square test determined significant differences among the frequencies of the categorical data, and the t-test identified significant relationships among the instructional strategies and preferences.

For Providing Feedback

After GRSLSS data input were confirmed, total and mean scores were calculated for each dimension according to an individual profile format (see Appendix J for sample). The Microsoft Word and Systat programs for Macintosh were used to create the profiles. The researcher returned a personal profile and a dimension interpretation to each student in a sealed envelope by September, 1993. Thereafter, the index cards with the students' names and identification numbers were destroyed.

Students were provided with personal profiles for two reasons. Firstly, review of the learning style literature generally supports providing students with some form of feedback when they complete a learning style assessment (Duckwall, Arnold and Hayes, 1991; Henson and Borthwick, 1984; Riechmann-Hruska, 1989; Riechmann-Hruska & Grasha, 1982). Indeed, the instruments are usually constructed and implemented in such a manner that they can be self-scored or yield computerized results. According to Price, Dunn and Dunn (1991), describing personal preferences to an adult may encourage follow-up which "will maximize the use of learned skills, remove obstacles to creativity, and maximize performance" (p. 5).

Secondly, since the nursing profession is moving toward a research basis for its actions, professional novices require an orientation to the research process and its potential benefits. As the data source for this research undertaking, students were

exposed to the process experientially. Furthermore, by being informed about their results and what the results implied, their awareness of the pragmatic aspect of research may have been enhanced.

Summary

This chapter focused on the methods implemented for data collection. The study was identified as a quantitative, non-experimental, cross-sectional design. The subjects for this study were a population of first year students enrolled in four institutions participating in a collaborative nursing program in Edmonton, Alberta, Canada. Self-reported data was collected using two instruments: the previously developed Grasha-Riechmann Student Learning Style Scales and a Demographic Data Questionnaire which was created for this research. The data collection instruments were explained and justified. Procedures were discussed for maintaining constancy, insuring the rights of the subjects, investigating the data, and providing the participants with feedback. Findings, emanating from the procedures discussed in this chapter, will be reported in the next chapter.

Chapter Four

Data Analysis and Results

Self-reported data were analyzed for this study. It was collected through the Demographic Data Questionnaire and the Grasha-Riechmann Student Learning Style Scales (GRSLSS) which were completed by each of the 287 participating nursing students. The data from the Demographic Data Questionnaire described the respondents in terms of age, gender, marital status, number of dependents, highest pre-entry academic achievement, and intended completion program. It also provided information about variables that could impact on the intended completion program or the instructional preferences of the participants. The information from the GRSLSS was used to describe the respondents' instructional preferences in terms of six dimensions: independent, avoidant, collaborative, dependent, competitive, and participant. The data were analyzed with a statistical program for the Macintosh computer. Although the statistically significant level for the findings in this study was $p<.05$, smaller significance levels were reported as actual values.

The purpose of this chapter is to report the findings from the data analysis. The chapter begins with a presentation of respondents' characteristics. This is followed by an explanation of the reliability and validity findings for the GRSLSS, relative to this study and subject group. The remainder of the chapter is a discussion of the findings that are pertinent to the three questions this study seeks to answer:

1. What do available students in the 1992 entry collaborative nursing program perceive their instructional preferences to be in a formal teaching situation, with specific reference to conditions of social interaction and control?
2. Are there statistically significant relationships between the identified instructional preferences of available students in the 1992 entry collaborative nursing program?

3. Are there significant differences in the identified instructional preferences of subgroups of available students in the 1992 entry collaborative nursing program as determined by age, gender, marital status, pre-admission academic achievement, dependents, or intended completion program option?

Subject Data

Subjects' ages ranged from 17 to 56 years with a mean of 23.3 years (SD = 6.2) and a median of 21 years. Slightly more than one-third of the study respondents were under 20 with another third of the group in the 20 to 24 age category. Since subjects over 24 years constituted slightly less than one-third of the group, collapsing the three older age groups into one made the age distributions more equitable.

There were 253 females and 34 males. Although females tended to be younger, with a mean of 23 years (SD = 6.2) compared to a mean of 25.3 years (SD = 5.5) for males, the age difference was not significant. Over 75% of the participants were single, with the remainder reporting married, separated, divorced, widowed, or other marital relationships. Consequently, it was no surprise that most of the respondents (229) reported having no individuals dependent on them for physical, legal or financial support. With regard to gender, marital status, and dependents, there was distribution disparity among/between the listed options for each variable. Therefore, it could not be assumed that data were normally distributed. Since inferential analysis is based on this assumption, the finding implied a need for re-categorization and assessment before attempting such analysis for gender, marital status, and dependents.

Slightly less than half (40%) of the subjects entered the program with high school academic achievement. More than one-third (35%) had some university preparation or a baccalaureate degree. The remaining 25% of participants had completed diplomas, certificates or some college level courses. The distribution of subjects among the options originally listed for pre-entry academic achievement was disproportionate. However, this disparity appeared correctable by re-categorization from five to three groups, according to

university, non-university post secondary, and high school experiences. With a more equitable distribution of subjects, normal distribution of data could be assumed and inferential analysis could be used.

The majority (72.6%) of subjects 19 years and younger reported high school as their pre-entry academic achievement. Over half (56%) of the 20 to 24 age group entered with some university courses or a baccalaureate degree, whereas almost half (45%) of the respondents over 25 years had some college courses, a diploma, or a certificate. This finding indicated a possible relationship between age and pre-entry academic achievement.

A total of 280 students reported their intended completion program, with the majority (63%) designating the baccalaureate degree. Those intending the baccalaureate completion tended to be younger with a mean age of 21.7 years (SD = 4.7) compared to a mean age of 26.1 (SD = 7.2) for those intending diploma completion. Age difference was significant, $t(275) = -6.31$, $p<.005$. Considerably more students indicated a preference for baccalaureate degree completion if other factors, such as financial constraints and family responsibilities, did not have to be considered. Because of the disproportionate distribution of subjects between the baccalaureate and diploma programs in a free choice situation, normal distribution of data was highly unlikely. The disparity implied that further inferential analysis according to completion program of choice would result in invalid findings.

Reliability and Validity of the GRSLSS

The responses on the Grasha-Riechmann Student Learning Style Scales (GRSLSS) were analyzed for internal consistency using Cronbach's alpha. As demonstrated in Table 1, each dimension demonstrated some degree of internal consistency and supported reliability. Reliability was strongest for the avoidant, collaborative, competitive, and participant dimensions. It was weakest for the dependent and independent dimensions.

Based on a recommended reliability correlation of .50 or higher, the reliability of the independent dimension was unacceptable (Smith & Glass, 1987).

Table 1

Estimation of Internal Consistency for the Dimensions of the Grasha-Riechmann Student Learning Style Scales

Dimension	GRSLSS Items Used	Total Items	Cronbach's Alpha
Avoidant	Questions 2, 8, 14, 20, 26, 32, 38, 44, 50, 56	10	.77
Collaborative	Questions 3, 9, 15, 21, 27, 33, 39, 45, 51, 57	10	.73
Competitive	Questions 5, 11, 17, 23, 29, 35, 41, 47, 53, 59	10	.69
Participant	Questions 6, 12, 18, 24, 30, 36, 42, 48, 54, 60	10	.67
Dependent	Questions 4, 10, 16, 22, 28, 34, 40, 46, 52, 58	10	.54
Independent	Questions 1, 7, 13, 19, 25, 31, 37, 43, 49, 55	10	.44

Note. N = 260

Instructional Preferences of Participants

The first question this study sought to answer involved a determination of the instructional preferences of students in the collaborative nursing program. This question was addressed by analyzing the means for each dimension of the GRSLSS using descriptive statistics. The mean for each dimension had the potential of varying from a maximum of 5 to a minimum of 1. The higher the mean, the stronger the preference for the behaviors associated with the dimension. As indicated in Table 2, students registered preferences for each dimension, but reported the strongest preferences for collaborative, dependent, participant, and independent behaviors in a teaching-learning situation. Competitive and avoidant instructional preferences were less popular.

The dimensions are representative of interpersonal interaction and control circumstances in a teaching-learning situation. The competitive and collaborative scales evaluate the degree to which a student is motivated to interact and assume responsibility for sharing ideas and talents in a learning situation. The avoidant and participant scales explore a student's preference for the interactions and control associated with a traditional classroom. The independent and dependent scales assess the interpersonal and control

circumstances the student desires to support intellectual curiosity and initiative. As noted by Andrews (1981), the items for the collaborative, dependent, and participant dimensions are more interpersonally oriented in that they describe the learner interacting with peers and/or teachers. Conversely, the items for the competitive, independent, and avoidant dimensions suggest less interaction with others and are more impersonal. The subjects in this study reported a stronger preference for the interpersonal items of the collaborative, dependent, and participant dimensions than they did for the more impersonal behaviors of the independent, competitive, and avoidant dimensions. This suggested that the students were more interpersonally than impersonally inclined.

Table 2

Instructional Preferences as Expressed Through the Dimensions of the Grasha-Riechmann Student Learning Style Scales

Dimension	Minimum Respondent Mean	Maximum Respondent Mean	Group Mean	SD.	Group Median
Collaborative	2.5	5.0	3.83	0.474	3.9
Dependent	2.7	4.8	3.82	0.378	3.8
Participant	2.5	4.8	3.73	0.443	3.8
Independent	2.2	4.6	3.44	0.385	3.4
Competitive	1.0	3.8	2.55	0.534	2.6
Avoidant	1.1	3.9	2.41	0.566	2.4

Note. N = 287. Means range from a possible low of 1 (slight preference), through a possible high of 5 (pronounced preference). Neutrality = 3.

Since each dimension has specific behaviors associated with it, the results can be further elaborated (see Appendix B). For example, the higher collaborative mean suggested that students preferred to work cooperatively with teachers and peers, and to participate in interpersonal endeavors. Similarly, the dependent mean implied that participants had a desire for peer and teacher support through interpersonal interaction. Likewise, the participant mean intimated that the respondents enjoyed classroom interactions with each other and their teachers, and they were inclined to assume responsibility for getting the most out of the classes they attended. Although the

preference was not strong, the independent mean suggested respondents were inclined towards learner-centered activities and working alone, but would participate with others. Since the competitive mean was low, students appeared to be disinclined towards working on their own for rewards and assuming leadership or dominant roles in an interpersonal interaction. Similarly, the avoidant mean implied that participants found classroom interactions with their peers or teachers more desirable than undesirable.

The mean and median scores were similar for each dimension and standard deviations were small. These findings suggested a reasonably symmetrical distribution of scores. Except for the avoidant dimension, all of the dimensions were slightly negatively skewed or skewed to the left, indicating that the distribution favored lower means. Kurtosis was evident but not excessive. Positive kurtosis values indicated that the distribution of cases at the upper and lower means was slightly greater than normal for the independent, dependent and participant dimensions. Conversely, negative values suggested that there were few extremely high or low scores for the avoidant, collaborative, and competitive dimensions. Consequently, although the dimensions did not register true normal curves, the distributions were considered acceptable for the use of inferential analyses of the instructional preferences of the respondents in this study.

Overall, each of the instructional preferences existed in the student to some degree, so one preference was not adopted exclusively. However, the preferences, as expressed through the dimension means, were strongest for collaborative, dependent, participant, and independent instructional circumstances, in descending order. The proclivity for competitive and avoidant behaviors was less strong. In other words, interpersonal instructional preferences (collaborative, dependent, and participant dimensions) were more popular than those that were impersonal (competitive, independent, and avoidant dimensions).

Significant Relationships Among Instructional Preferences

The second question with which this study was concerned was to determine if there were significant relationships among the identified instructional preferences of students in the collaborative nursing program. This question was addressed by analyzing the six dimensions of the GRSLSS using the Pearson correlation coefficient test. As demonstrated in Table 3, there were three significant positive correlations: between the participant-collaborative, participant-dependent, and competitive-avoidant dimension pairs. In addition, the negative participant-competitive and participant-avoidant correlations were significant. There were no significant relationships between the dimensions forming the other pairs.

Table 3

Significant Relationships Between the Instructional Preference Dimensions of the Grasha-Riechmann Student Learning Style Scales

Variables	1	2	3	4	5	6
1) Independent	1.000					
2) Avoidant	0.093	1.000				
3) Collaborative	-0.086	-0.098	1.000			
4) Dependent	0.038	-0.085	-0.017	1.000		
5) Competitive	0.096	0.286***	-0.064	0.070	1.000	
6) Participant	0.041	-0.706***	0.253***	0.206**	-0.180*	1.000

Note. Results based on Pearson correlation coefficient test and Bonferroni probability. N = 287.

*p<.05. **p<.01. ***p<.0005.

With regard to the significant correlations, the negative relationship between the participant and avoidant dimensions was the only one with a strong linear relationship (r = -.706). According to this relationship, high scores in one dimension corresponded with low scores in the other dimension. The high correlation suggested that data points constituted a thin ellipse about a fixed line, and there was a tendency for anticipated and actual values to agree. With reference to the significance level, the association between

the two variables was unlikely due to chance. For the remainder of the significant relationships, the correlations were low indicating that the relationship between the variables was weak.

Originally, the developers of the GRSLSS believed that the six dimension were three bipolar pairs or three sets of opposites (Riechmann-Hruska & Grasha, 1982). Consequently, they expected negative relationships between participant-avoidant, independent-dependent, and competitive-collaborative pairs. In this study, the association between the participant and avoidant dimensions was the only significant relationship that could be considered a bipolar pair. In this situation, active class involvement which maximizes learning benefits for all is opposed by an evasion of teaching-learning activities involving interactions with teachers and/or peers. The negative relationship between the competitive and collaborative dimensions was an opposing association, but it was weak and non-significant. There was no negative relationship between the independent and dependent dimensions.

Overall, the avoidant-participant relationship was the only situation where knowing one preference suggested the degree to which the other would be expressed. The other dimensions were clearly more autonomous and separate. Worthy of note was the lack of significant correlation between the independent dimension and any other, including its bipolar opposite, dependent. The other five dimensions correlated significantly with at least one other.

Significant Differences in Instructional Preferences by Demographic Groups

The third question addressed by this study was whether there were significant differences in the identified instructional preferences of subgroups of students in the 1992 entry collaborative nursing program. To address this question, GRSLSS means by demographic groups, were analyzed for significant differences. Groups were collapsed within some of the demographic categories in an attempt to correct distribution disparity and increase the validity and reliability of the findings. Consequently, age groups were

re-categorized as 19 and under, 20 to 24, and 25 and over. Dependents was collapsed into none and one or more, and marital status into single or other. Academic achievement groups were reduced to three levels: high school, university courses or degree, and non-university post secondary.

The demographic variables were then analyzed according to descriptive statistics for three reasons. Firstly, the means could be assessed to determine that there were differences to be analyzed for significance. Secondly, the differences between the dimension means within a demographic category could suggest the direction of preference relationships. Thirdly, the response distribution could be evaluated for disparities between the groups.

As indicated by the means reported in Table 4, instructional preferences differed according to gender, number of dependents, marital status, and completion program of choice. Males expressed stronger preferences than females for the impersonal independent, avoidant, and competitive dimensions. Conversely, females reported stronger preferences than males for the more interpersonal dependent and participant dimensions. It appeared that males were more inclined toward learning activities in which they worked alone, whereas females had a proclivity for interactive actitivies with teachers and peers. Results based on marital status were similar. As with males, the three impersonally-oriented dimensions were more popular with single students than those involved in other marital situations. The suggested preference patterns were less clear for the dimension statistics based on number of dependents and completion program of choice. Although there were differences between the means through which instructional preferences were expressed, subjects were unequally distributed according to gender, dependents, marital status, and completion program of choice. Consequently, normal distribution of instructional preference data could not be assumed. Therefore, the differences among the dimension means by gender, dependents, marital status, and

completion program of choice were not analyzed for significance, as any significant findings would be invalid.

Table 4

Dimension Means Expressing Instructional Preferences That Could Not Be Analyzed for Significant Differences Because of Distribution Disparity

		Dimensions					
Groups	n	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant
Gender							
Male	34	3.55	2.46	3.88	3.74	2.66	3.68
Female	253	3.42	2.40	3.82	3.83	2.53	3.74
Marital Status							
Single	220	3.44	2.48	3.86	3.82	2.59	3.66
Other	67	3.43	2.16	3.73	3.84	2.41	3.95
Number of Dependents							
None	229	3.43	2.47	3.84	3.83	2.58	3.67
One or more	57	3.43	2.17	3.80	3.80	2.43	3.95
Completion Program of Choice							
Degree	238	3.44	2.38	3.84	3.82	2.56	3.75
Diploma	47	3.39	2.51	3.80	3.84	2.49	3.68

According to Table 5, there were differences among the dimension means by groups according to age, academic achievement and intended completion program. With regard to age, the avoidant and competitive preferences progressively decreased with age, whereas participation preference progressively increased with age. In other words, the preference for classroom interactions with teachers and peers and the desire for sharing ideas and talents with others in a learning situation increased in relation to the subject's age. Independent, collaborative, and dependent preferences were highest for those aged 20 to 24. Students with high school pre-entry academic achievement expressed the strongest feelings for three dimensions which were more impersonally than interpersonally oriented. Those intending degree completion achieved higher means in the majority of the dimensions, but no particular instructional preference for social interaction was suggested. Furthermore subject distribution among the collapsed groups for age and academic achievement were more equitable than the previous categorization

results. Consequently, analysis of variance was used to identify significant differences between the group means of each demographic variable.

Table 5

Dimension Means Expressing Instructional Preferences That Could Be Analyzed for Significant Differences

		Dimensions					
Groups	n	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant
Age							
19 and under	106	3.42	2.58	3.84	3.83	2.62	3.60
		(.36)	(.54)	(.45)	(.35)	(.54)	(.44)
20 - 24	91	3.46	2.43	3.86	3.84	2.58	3.69
		(.37)	(.56)	(.47)	(.38)	(.52)	(.40)
25 and over	87	3.45	2.17	3.78	3.79	2.41	3.95
		(.42)	(.52)	(.51)	(.41)	(.53)	(.42)
Academic Achievement							
High school	115	3.43	2.50	3.89	3.84	2.61	3.69
		(.40)	(.57)	(.47)	(.34)	(.53)	(.43)
University	101	3.48	2.39	3.79	3.80	2.55	3.74
		(.39)	(.52)	(.46)	(.43)	(.52)	(.45)
Non-university	71	3.40	2.28	3.79	3.83	2.43	3.79
		(.35)	(.60)	(.50)	(.37)	(.54)	(.45)
Intended Completion Program							
Degree	177	3.47	2.37	3.83	3.84	2.61	3.74
		(.40)	(.55)	(.48)	(.37)	(.54)	(.43)
Diploma	103	3.37	2.44	3.84	3.81	2.43	3.73
		(.35)	(.57)	(.46)	(.39)	(.52)	(.45)

Note. Numbers in parentheses represent the standard deviation for the means immediately above them.

As demonstrated in Table 6, there were no statistically significant differences in the dimension by age group means for independent, collaborative and dependent preferences. However, there were significant differences between the means of at least two age groups in each of the avoidant, competitive, and participant dimensions. Consequently, age appeared to influence the subject's preference for classroom interactions with teachers and peers, plus the inclination to share ideas and skills in a learning situation.

Table 6

Instructional Preferences Significantly Influenced by Age

Dimension	Source	SS	Degrees of Freedom	Mean Square	F Ratio	F Probability
Independent						
	Age	0.07	2	0.04	.24	.786
	Error	41.02	281	0.15		
Avoidant						
	Age	8.33	2	4.16	14.22	.000**
	Error	82.31	281	0.29		
Collaborative						
	Age	0.34	2	0.17	1.75	.474
	Error	63.67	281	0.23		
Dependent						
	Age	0.10	2	0.05	0.34	.712
	Error	40.31	281	0.14		
Competitive						
	Age	2.27	2	1.14	4.08	.018*
	Error	78.23	281	0.28		
Participant						
	Age	6.19	2	3.10	17.59	.000**
	Error	49.47	281	0.18		

Note. N = 284. Results based on analysis of variance for dimension by age.
*p<.05. **p<.0005.

Using the Tukey HSD simultaneous pairwise comparison, the dimensions with significant differences were analyzed to identify the specific age groups that differed. As indicated in Table 7, older students differed significantly from younger students in avoidant, participant, and competitive preferences. Older students expressed more interpersonal preference in that they were significantly less inclined to avoid classroom interactions than their younger counterparts. Furthermore, older students were significantly more predisposed towards interpersonal, participant behaviors than younger students. However, impersonal competitive behaviors were significantly less popular with older students than those under 20. Overall, older students expressed more interpersonal orientation. There were no statistically significant differences in the

competitive instructional preferences of students aged 20 to 24 and their younger or older counterparts.

Table 7

Comparison Test of Mean Differences for Dimension by Age Analysis

Dimension /Age Group	Age Group 19 & under	20 - 24	25 & over
Avoidant			
19 & under	0.000		
20 - 24	- 0.153	0.000	
25 & over	- 0.416**	- 0.263**	0.000
Participant			
19 & under	0.000		
20 - 24	0.092	0.000	
25 & over	0.352**	0.260**	0.000
Competitive			
19 & under	0.000		
20 - 24	- 0.044	0.000	
25 & over	- 0.210*	- 0.167	0.000

Note. Results based on Tukey HSD multiple comparisons.

*p<.05. **p<.005.

There were no significant differences in the dimension by pre-entry academic achievement means for the independent, dependent, collaborative, competitive, and participant preferences. However, there was a significant difference between the avoidant means of at least two pre-entry academic achievement categories, F (2, 284) = 3.473, p<.032. Therefore, pre-entry academic experience appeared to have a minimal influence on instructional preference. According to post-hoc analysis, avoiding classroom activities and interactions was significantly more popular with students entering the program with high school than it was with students entering with some college courses, a certificate, or a diploma (see Table 8). The students with a non-university post-secondary background expressed a significantly greater preference for activities in which they would be interacting with teachers and/or peers. Furthermore, the avoidant preferences of students who had previously attended university did not differ

significantly from those entering the program with experiences from non-university post secondary institutions or high school.

Table 8

Comparison Test of Mean Differences for Dimension by Pre-entry Academic Achievement Analysis

Dimension /Academic Achievement	Academic Achievement		
	Non-university post secondary	High school	University courses/ degree
Avoidant			
Non-university post secondary	0.000		
High school	-0.220*	0.000	
University courses/degree	0.103	- 0.116	0.000

Results based on Tukey HSD multiple comparisons.

*p<.05.

According to an independent t-test, the avoidant, collaborative, dependent and participant means of those intending to complete the program with a baccalaureate degree did not differ significantly from those intending diploma completion (see Table 9). Conversely, the independent and competitive means of those intending degree completion were significantly higher than those intending diploma completion. Since the internal consistency of the independent dimension was low, the statistically significant finding for this dimension was suspect. However, the competitive finding implied that students intending to pursue a baccalaureate degree were more inclined towards working alone for achievements and preferred less interaction with teachers and peers. Since students intending degree completion tended to be younger, this finding was consistent with the finding that student under 20 years preferred competitive behaviors.

Table 9

Comparison of Dimension Means by Intended Completion Program

Dimension	Baccalaureate Completion[a] Mean	SD	Diploma Completion[b] Mean	SD	t	p
Independent	3.47	.40	3.37	.35	2.080	0.038*
Avoidant	2.37	.55	2.44	.57	-0.972	0.332
Collaborative	3.83	.48	3.84	.46	-0.167	0.867
Dependent	3.83	.37	3.81	.39	0.533	0.595
Competitive	2.61	.54	2.42	.51	2.751	0.006**
Participant	3.74	.43	3.73	.45	0.302	0.763

Note. N = 280. df = 278.

[a]n = 177. [b]n = 103.

*p<.05. **p<.01.

Potential Confounding or Moderating Influences

According to the descriptive statistics for this study, subjects who were 19 years and younger reported high school pre-entry academic achievement more frequently than other age groups. In addition, university courses or degrees were reported in greater numbers by those 20 to 24 years, whereas college courses, diplomas and certificates were claimed more frequently by those over 25 years. Since there was an implied relationship between age and pre-entry academic achievement, a chi-square test was initiated to determine its significance. Findings supported a significant relationship between these variables, χ^2 (4, N = 284) = 19.12. In addition, according to inferential analysis, age and pre-entry academic achievement significantly influenced the avoidant preferences of subjects in this study. Students under 25 years expressed stronger avoidant preferences than their older peers, and students with high school pre-entry academic achievement favored avoidant behaviors more than students with non-university post secondary experiences. Consequently, the younger students and those entering the program with high school as their highest academic achievement were more inclined toward activities in which classroom interactions with teachers and/or peers were minimal. To determine if the avoidant findings were influenced by the relationship between the two independent variables, a multivariate analysis of variance was completed with age as a covariate for

the avoidant dimension by academic achievement group. No significant differences were found, $p>.05$. This suggested that each variable influenced the avoidant preference independently, and that the age results were not influenced by pre-entry academic achievement and vice versa. It should be noted that the re-categorized groups for these variables were used for all analyses.

Based on a review of the literature, previous experiences may influence instructional preferences and confound or moderate any significant findings associated with their relationship to other variables. Consequently, descriptive statistics were calculated for dimension means by experience with selected instructional strategies: lecture, simulation, problem-based learning, seminar, and demonstration. As indicated in Table 10, the dimension means of those with and without the strategy experience differed in all cases. Although distributions were equitable between the two groups in most cases, it was particularly disproportionate for the lecture and demonstration strategies. Since it was highly unlikely that some students had never been exposed to these teaching strategies, especially lecture, the validity of the responses was questionable, and findings from any subsequent analysis of these experiences would have little value. Consequently, further analysis was restricted to determining significant differences among the dimension means by seminar, problem-based learning, and simulation experiences. According to t-test analysis, there were no statistically significant differences between the means of experienced and inexperienced students with regard to these strategies ($p>.05$).

Table 10

Instructional Preference Suggested by Mean Dimension Scores of Students According to Their Experience with Selected Instructional Strategies

Instructional Strategy /Experience	n	Dimensions					
		Independent	Avoidant	Collaborative	Dependent	Competitive	Participant
Lecture							
Yes	275	3.44	2.39	3.82	3.82	2.54	3.74
No	12	3.34	2.88	4.08	3.82	2.71	3.53
Simulation							
Yes	121	3.46	2.44	3.86	3.78	2.52	3.72
No	166	3.42	2.38	3.81	3.85	2.56	3.74
Problem-based learning							
Yes	165	3.44	2.43	3.85	3.84	2.54	3.72
No	122	3.44	2.37	3.80	3.80	2.55	3.74
Seminar							
Yes	180	3.47	2.41	3.84	3.82	2.53	3.74
No	107	3.39	2.41	3.81	3.82	2.57	3.71
Demonstration							
Yes	207	3.45	2.46	3.89	3.82	2.60	3.71
No	80	3.42	2.28	3.69	3.84	2.41	3.79

Logic suggested that changing demographics could affect intended completion program and thereby influence instructional preference findings. According to chi-square analysis, there was a significant relationship between intended completion program and age, marital status, dependents, and academic achievement (see Table 11). In other words, age, marital status, number of dependents, and pre-entry academic achievement influenced the completion program the subject planned to pursue. This implied that changes in demographics could confound or moderate the significance of instructional preferences based on intended completion program.

In addition, financial concerns and family responsibilities were significantly related to intended completion program, χ^2 (1, N = 280) = 29.08 and χ^2 (1, N = 280) = 40.22, respectively. Financial concerns and family responsibilities influenced the decision in some way. For those expressing such cares, students intending to complete with a diploma reported worries about family responsibilities more frequently than those

intending to complete the baccalaureate program. Both groups expressed financial concerns equally. These significant relationships implied that changes in the financial support and family situations of students could affect the completion program selected by them. Such changes, in turn, could affect the demographic composition and distribution of students in the completion programs, and thereby impact on the reported instructional preferences. With a different student sample in the completion program, the instructional preferences reported for this study may not be replicable.

Table 11

Relationship Between Demographic Variables and Intended Nursing Completion Program

	Intended Completion Program					
Variables	Baccalaureate	Diploma	Total	df	χ^2	p
Age						
19 and under	83	20	103	2	32.921	.000**
20 - 24	57	32	89			
25 & over	34	51	85			
Total	174	103	277[a]			
Gender						
Male	16	18	34	1	3.589	.058
Female	161	85	246	1		
Total	177	103	280			
Marital Status						
Single	152	63	215	2	22.939	.000**
Other	25	40	65			
Total	177	103	280			
Number of Dependents						
None	156	68	224	1	17.513	.000**
One or more	21	34	55			
Total	177	102	279[b]			
Academic Achievement						
High school	78	34	112	2	9.524	.009*
University	66	33	99			
Non-university	33	36	69			
Total	177	103	280			

Note. Pearson chi-square was used for 2 x 3 tables. Yates corrected chi-square test was used for 2 x 2 tables to adjust the Pearson chi-square statistic for small samples.

[a]Three subjects in the baccalaureate group did not report age. [b]One subject in the diploma group did not report number of dependents.

*p<.01. **p<.0005.

Summary

For this study, there were 287 participants ranging in age from 17 to 56 years. The average age was 23.3 years (SD = 6.2) with males averaging 25.3 years (SD = 5.5) and females 23 years (SD = 6.2). A marked majority of the subjects were female, single, and had no dependents. The majority of students intended to complete the program with a baccalaureate degree, and considerably more students would select this option if other factors did not have to be considered. Since disproportionate dispersions were noted for all demographic variables except intended completion program, re-classification was implied to promote a more normal and valid data distribution.

Although all of the dimensions of the GRSLSS demonstrated internal consistency, it was strongest for the avoidant, collaborative, competitive, and participant dimensions. The moderate correlation for the dependent dimension was acceptable. However, the reliability of the independent dimension was questionable.

With regard to the first question addressed by this study, the students in the collaborative nursing program reported collaborative, dependent participant, independent, competitive, and avoidant instructional preferences, in that descending order. In other words, interpersonal instructional circumstances were more popular than those that were more impersonal. This finding suggested that the subjects preferred activities in which they interacted and participated with teachers and/or peers, moreso than activities in which they worked on their own and did not share their ideas and talents. Regarding the second question, there were significant relationships between the participant-collaborative, participant-dependent, competitive-avoidant, participant-competitive, and participant-avoidant preferences of students in the collaborative nursing program. However, the negative participant-avoidant relationship was the only one with any strength ($r = -.706$).

Relative to question three, there were significant differences in identified instructional preferences by demographic groups. However, these findings were limited

to age, pre-entry academic achievement, and intended completion program because of group size disparities. There were significant differences between older and younger students with regard to avoidant, competitive and participant preferences. Students over 25 were more inclined towards interpersonal behaviors such as participation, whereas impersonal competitive and avoidant preferences were more popular with students under 20 years. Furthermore, students with high school pre-entry experience expressed significantly less interest in classroom activities and interactions than students who had non-university post secondary experiences. In addition, respondents intending degree program completion professed significantly greater independence and competition inclinations. However, the former preference was questionable because of the internal reliability finding for the independent dimension in this study.

Potential confounding or moderating variables were evaluated. Previous experience with selected instructional strategies was not significant. However, it was determined that age, marital status, number of dependents, and pre-entry academic achievement were significantly related to intended completion program. Furthermore, financial and family responsibilities significantly influenced intended completion program. Consequently, study findings relevant to intended completion program may not be confirmed by a different group of students. The data and analyses from this study will be further discussed in the next chapter, along with ensuing implications, recommendations and conclusions.

Chapter Five

Discussion, Implications and Recommendations

The purpose of this study was to identify the perceived instructional preferences of a group of Canadian student nurses. Instructional preference was determined through the Grasha-Riechmann Student Learning Style Scales (GRSLSS) which, when scored, resulted in means for six dimensions labeled independent, avoidant, collaborative, dependent, competitive, and participant. Demographic information was obtained with the Demographic Data Questionnaire specifically developed for this study. Statistical programs for Macintosh were used for the descriptive, non-parametric, and inferential analyses of data from the 287 participants. Findings were used to compile the subject profile, assess the reliability of the GRSLSS, and answer the three questions addressed by this study. Although the statistically significant level for results was $p<.05$, smaller significance levels were reported as actual values.

The average student participating in this study was single, female, between 23 and 24 years of age, and without dependents. She entered the nursing program with preparation above the high school level, probably a university degree or some university courses, based on her age group. Her intended completion program was a baccalaureate degree. Although this student expressed both impersonal and interpersonal instructional preferences, she tended to favor interpersonal behaviors overall, and to specifically express either participation or avoidance instructional preferences. According to her pre-entry academic achievement, her instructional preferences were not significantly different from her peers. However, based on her age group, she differed significantly from students 25 years and older regarding avoidant and participant instructional preferences. She tended to express a stronger preference for avoiding classroom learning situations involving interactions with teachers and/or peers and a weaker inclination toward sharing activities than her older peers. Consistent with this student's intended completion

program, she had a significantly greater proclivity for competitiveness and independence than those choosing a diploma completion. She was more inclined to working individually for rewards and to assume a leadership role in interactions. With reference to this finding, the internal consistency of the independent dimension was weak, so the statistically significant difference in independent preference to work alone is unreliable.

The purpose of this chapter is to discuss the results of the statistical analyses and their inferences. Consequently, the chapter begins with a discussion of pertinent findings and the factors that influence their interpretation. This is followed by a presentation of the educational and research implications spawned by the findings. The chapter and the study conclude with recommendations for future research and suggestions for improving a similar study.

Discussion of Findings

Subject Data

The majority of students participating in this study were under 25 years of age, with a mean age of 23.3 years. The average age and high percentage of younger students paralleled the Statistics Canada (1993) profile of college students. Furthermore, the majority of the nursing students were single or living apart from their spouse, findings similar to those for post secondary students (Nordstrom, 1989). Since students ranged in age from 17 to 56 years, they were either adolescents or adults according to chronological age (Schaie & Willis, 1991). However, as students in a post secondary institution, they tended to be considered adults, specifically adult learners, a classification with many definitions. In this research, the participants were assumed to be adult learners in that they were fully developed physically, capable of making judgments, and seeking autonomy to some degree (Rogers, 1986). Since the subjects in this study tended to be younger and possibly in late adolescence, this is a reasonable developmental expectation.

The gender-related results of this research were less consistent with previous findings. The higher distribution of females to males was consistent with comparisons

for post secondary education (Endorf and McNeff, 1991; Nordstrom, 1989; Statistics Canada, 1993). However, the current findings disputed Okrainec's (1986) conclusion that increasing numbers of males in nursing would continue to account for only 1.42% of the nursing population. Although the males were not graduates in this situation, the enrollment of 12% males did not approximate the projected distribution. Furthermore, the average age of the male respondents was 25.3 years compared to a mean age of 23 years for females, a non-statistically significant age difference. This finding contradicted Nordstrom's (1989) report that women in undergraduate education tended to be older than men. However, the disparity between the gender group sizes could be influencing the findings in this study.

A marked majority of the student nurse subjects claimed no responsibilities for dependents. This was unexpected since nursing students are post secondary students who typically have competing interests and responsibilities (Rogers, 1986). However, a high percentage of the subjects were young and single, attributes frequently associated with no dependents. The literature also characterizes adult learners, who enter undergraduate schools, as resuming college studies rather than entering as uninitiated students (Endorf & McNeff, 1991; Nordstrom, 1989; Rogers, 1986). This perception was supported by the finding that 60% of the respondents in this study had pre-entry academic preparation above the high school level.

With regard to completion program, the majority of students intended to pursue a baccalaureate degree. The average age of this group was 21.7 years which was significantly different from the mean of 26.1 years for those intending a diploma completion, $t(275) = -6.31$, $p<.005$. These findings were consistent with Nordstrom's (1989) report that younger adults in post secondary institutions were more interested in earning degrees than older adults. Furthermore, the results conformed to professional entrance requirements projected for nurses for the year 2000. An additional 20% of students selected the baccalaureate degree when the completion program was freely

chosen. This difference could be an indication that other interests and responsibilities, associated with developmental level or the adult learner role, were influencing actions (Huyck & Hoyer, 1982; Rogers, 1986). Furthermore, the selection of a completion program could be affected by variables such as socioeconomic climate of the country and the field, personal perception of nursing roles, and/or career goals.

Overall, there was some congruence between the subjects in this study and those in other post secondary situations. However, it should be noted that this study was conducted in a context of high unemployment and financial constraints which could be influencing the current demographic findings. For example, larger numbers of participants could have been seeking alternate careers or enrolling directly from high school because of the limited employment options available to them. Furthermore, the baccalaureate program may be the entry to nursing practice in the foreseeable future. Therefore, the statistics concerning older students may be atypical in that they represent this age group's capitalization on an opportunity to graduate from a shorter diploma program while it still exists.

Reliability and Validity of the GRSLSS

The reliability and validity of the original 90-item GRSLSS were substantiated by previous research (Andrews, 1981; Riechmann & Grasha, 1974). However, they were assessed in this study to support the use of the questionnaire with the targeted nursing population and to evaluate the current 60-item questionnaire. Although varying in strength, each dimension demonstrated some internal consistency. In this study, Cronbach's alpha coefficient was $\geq .67$ ($N = 260$) for all but the dependent and independent dimensions, which were .54 and .44, respectively. As with previous research, the independent dimension continued to demonstrate a low internal consistency in this study. This finding may be due to item deficiencies or misinterpretation of the dimension items by the participants. Since students asked no clarification questions during the data collection, the latter seems highly unlikely. Since the subjects in this

study were young, their responses to the items determining the independent preference could have resulted from their developmental level. Regardless, the low internal reliability of the independent dimension is unacceptable (Smith & Glass, 1987). Furthermore, these results imply that the dimension items may not be measuring the same thing, and any findings relevant to the dimension are suspect. Although the internal consistency findings may be more a developmental issue than an item problem, further factor analysis and evaluation are indicated.

With one exception, the internal consistency findings for this research were similar to those reported by the GRSLSS developers for undergraduate college students (Riechmann & Grasha, 1974). The exception was the competitive dimension which was more internally consistent in the current study. One possible explanation for this difference is that following the initial study, the instrument developers modified the number of items per dimension. These modifications resulted in changes to the temporal reliability coefficients, and it is conceivable that similar differences may have been reflected in other reliability and validity tests of which the researcher is unaware.

Although the experts generally supported the face validity of the GRSLSS for nursing students, some items were considered inappropriate. However, there was little agreement on the questionable items. Since it was not requested, the rationale for considering an item inappropriate was unknown. Consequently, the cause of the inconsistencies among the experts was unclear. Possibly it was due to the subjective format selected for expert feedback or it may suggest that the experts were unfamiliar with the terminology associated with the learning style concept. Because the expert feedback was inconclusive and there were no explanatory data, the GRSLSS was not modified for this study. However, the experts' input suggested that further face validity evaluation is required.

Instructional Preferences of Participants

In this study, the instructional preferences of the subjects were expressed through dimension means that could range from 1 to 5. A higher dimension mean is associated with a stronger preference for the characteristics of the dimension (Riechmann-Hruska & Grasha, 1982). The characteristics of the dimensions reflect interpersonal interaction and control circumstances in a teaching-learning situation (see Appendix B). Accordingly, the collaborative, dependent and participant dimensions are associated with interpersonal behaviors, whereas the independent, avoidant, and competitive dimensions are characterized by more impersonal activities (Andrews, 1981).

Students expressed a preference for each of the six dimensions, so one was not adopted exclusively. This finding supports the developers' conclusion that individuals have a preference for each dimension to some degree (Riechmann-Hruska & Grasha, 1982). According to dimension means, the preferences varied in strength ranging from a high of 3.83 (SD = .474) for the collaborative dimension to a low of 2.40 (SD = .566) for the avoidant dimension. In declining strength, the students' preferred collaborative, dependent, participant, independent, competitive, and avoidant instructional circumstances. The interpersonal instructional preferences (collaborative, dependent, and participant dimensions) were stronger than impersonal ones (competitive, independent, and avoidant dimensions). Consequently, the students in this study were similar to Andrews' (1981) freshman university group in that both groups reported a tendency toward interpersonal rather than impersonal instructional preferences. They preferred learning activities in which they could share their ideas and skills and interact with teachers and/or peers. Furthermore the prioritization of the dimension means supported previous research findings that nursing and post secondary students are more collaboratively than competitively oriented (Andrews, 1981; Merritt, 1983). In both situations, the students preferred to share their ideas and cooperate with teachers and peers rather than work individually for academic rewards.

Significant Relationships Among Instructional Preferences

Each dimension mean correlated significantly with at least one other, with the exception of the independent dimension. For example, the participant dimension correlated positively with the collaborative and the dependent dimensions, and negatively with the competitive and avoidant dimensions. In addition, the avoidant and competitive dimensions had a weak positive relationship. Logically these findings made sense. It was reasonable to expect an increased or decreased preference for the interpersonal participant dimension to be accompanied by similar increases or decreases for the other interpersonal dimensions of collaboration and dependency. Likewise, it could be anticipated that impersonal preferences like competition and avoidance would be opposed by an interpersonal participant preference. As impersonal dimensions, it was appropriate that the avoidant and competitive preferences registered simultaneous increases or decreases.

However, it was surprising that the independent dimension lacked even a low significant relationship with another dimension in this study. Logically, a negative relationship could be anticipated between the impersonal independent preference and the more interpersonal preferences for dependence, collaboration, and participation. However, a non-significant independent-collaborative relationship was the only negative association identified. Unlike Andrews' (1981) finding, there was no negative relationship between independence and its bipolar opposite, dependence. This was not totally unexpected as previous results have been mixed concerning this relationship (Riechmann-Hruska & Grasha, 1982). In this study, the low internal consistency of the independent dimension could be affecting its relationship to other dimensions. In addition, the items assessing the independent dimension could be more susceptible to the developmental level of the subjects than those of the other dimensions. Nevertheless, the lack of a significant relationship suggests that this is a very separate and unaffiliated preference that may not be measuring the same construct as the other dimensions.

With regard to the strength of the relationships between the dimensions, the significant correlations tended to be weak, except for the participant-avoidant pair. In other words, the expression of independent, dependent, collaborative, and competitive instructional preferences was not strongly related to other preferences. The negative participant-avoidant relationship ($r = -.706$) suggested that a strong preference for one instructional circumstance was associated with a weak preference for the other.

Initially, the developers of the GRSLSS believed that the dimensions were three bipolar pairs in a negative relationship (Grasha, 1972). However, subsequent correlations between the dimensions have been inconclusive with one noteworthy exception, the negative relationship between the participant and avoidant dimensions (Andrews, 1981; Riechmann, 1974). Similar findings resulted from this research. The negative participant-avoidant pair formed the only significant relationship that could be considered bipolar. It was the only situation in which the determination of one preference significantly suggested what the other preference might be. If students had a preference for active class involvement they were less inclined toward evading interactions with teachers and/or peers, and vice versa. The relationship between the competitive and collaborative dimensions was negative, but it was small and non-significant. There was no negative relationship between the independent and dependent dimensions. Overall, the competitive, collaborative, independent, and dependent preferences were more self-contained and separate than the avoidant and participant dimensions. It's noteworthy that each finding of a significant participant-avoidant relationship has been based on research conducted with undergraduate university students over a period of two decades. This may imply that the finding has some temporal stability and generalizability to a broader population.

Significant Differences in Instructional Preferences by Demographic Groups

Descriptive statistics of the dimension means by demographic groups were calculated for three reasons. One reason was to determine that there were mean

differences to be analyzed for significance. The second reason was to determine the response distribution for the demographic groups. Lastly, the statistics were obtained to identify preference patterns suggested by the mean scores.

The age-based mean scores in this study were compared with those reported by Grasha (1990) as college-based norms (see Appendix J). Although the possibility of using Grasha's age groupings was investigated, the available information about the student nurse population for this study suggested that its use would result in considerable distribution disparity. Notwithstanding the differences in age categorization, there were some similarities between the two sets of findings. In both cases, avoidant and competitive preferences tended to decrease with age and participation preferences increased. Based on these results, increasing age appeared to be associated with a stronger preference for working with peers and teachers in learning activities. Furthermore, in this research the highest dimension means were registered by a younger age group, an observation that could be the result of differences in age categorization between the two reports. In this study, the subjects expressed stronger preferences for dependent and avoidant behaviors, and weaker preferences for competitive and participant activities than Grasha's (1990) undergraduate students. These results were contradictory. The higher avoidant and lower participant preferences suggested that the students in this study were less inclined towards interactive learning activities than the undergraduate students. Conversely, the weaker competitive and stronger dependent preferences implied that working alone for rewards was less popular with the subjects in this research than with college students.

According to the preferences suggested by the means in this study, males appeared to be more impersonally oriented than females. Their scores suggested a preference for working alone and evading interactive teaching-learning activities with teachers and peers. Although these findings were not explored for statistical significance because of group size disparities between the genders, they do not appear to support Price's (1987)

finding that males like to work with others and prefer to have an authority present. However, it should be noted that there were only 34 males providing data for this research.

Inferential analyses were used to determine if the mean variations of the dimensions within the demographic categories were statistically significant at or below a .05 level of significance. The analyses were limited to preferences based on age, pre-entry academic achievement, and intended completion program because of group size disparity between the subgroups of the other demographic variables. According to the inferential analysis of dimension means by age, there were significant differences related to the avoidant, competitive, and participant preferences.

The significant preference differences appeared to be mainly between the younger and the older respondents. For example, students over 25 were significantly more oriented towards participation, classroom interaction, and non-competitive behaviors than students 19 years and younger. Although instructional preference was determined differently, these findings support other nursing research that suggests a relationship between age and preference (La Mothe et al., 1991). Furthermore, the participant and competitive findings are similar to those based on Grasha's results with college students as cited by Riechmann-Hruska and Grasha (1982).

The only significant differences between the dimension means by pre-entry academic achievement related to the avoidant preference. Avoiding learning activities requiring interactions with teachers and/or peers was significantly more popular with students who had high school pre-entry academic achievement than it was with entrants who had college courses, diplomas, or certificates. It is interesting to note that the preferences of students with high school pre-entry experiences did not differ significantly from students with university experience. Similarly the preferences of students who attended university and those who had post secondary experiences at another facility prior to entering the program were not significantly different. The majority of students

reporting high school as pre-entry academic achievement were 19 years and younger, whereas, college courses, diplomas, and certificates were more frequently claimed by students who were over 25 years. Consequently, the results may be a developmental phenomenon, such as an expression of autonomy, or they may be reflecting differences in learner orientation resulting from previous experiences with learning environments and teaching philosophies.

With regard to completion program, independent and competitive behaviors were significantly more popular with students intending baccalaureate degree completion. This implied that the baccalaureate group preferred a more impersonal, less interactive learning environment than the diploma group. However, the reliability of the independent dimension was not acceptable in this study, so any significant findings based on it are suspect. If the independent finding was deleted, the significant impersonal orientation of students intending degree completion would be based on one dimension, hardly conclusive results.

According to the literature review, there was no information identifying the instructional preferences of baccalaureate and diploma students. However, there was limited research that investigated the instructional preferences of generic and post RN baccalaureate students using measurement instruments other than the GRSLSS (King, 1988; Linares, 1989; Merritt, 1983). This research found that generic students expressed a stronger interpersonal preference than post RN baccalaureate students. Since post RN baccalaureate students are nurses who graduated from diploma or associate degree nursing programs, they could be considered representative of diploma students. Although the results of the current research contradicted previous findings, there are too many differences between them to make valid comparisons.

Potential Confounding or Moderating Influences

Potential confounding or moderating influences were assessed to determine factors that could negatively impact on the credibility of the findings from this research. For

example, several researchers and theorists have suggested that environment and experience can modify learning style, of which instructional preference is a part (Grasha, 1972; Price, 1982; Ramsden, 1988; Schmeck, 1988). It could be assumed that the participants in this study have had varied experiences with instructional strategies as a result of coursework before or during the nursing program. Therefore, previous experiences with instructional strategies could influence the instructional preference findings in this study.

This concern was addressed by exploring the relationship between instructional preferences and five instructional strategies that are currently employed in schools of nursing: lecture, simulation, problem-based learning, seminar, and demonstration. According to descriptive statistics, there was a markedly disproportionate distribution between those with and without demonstration and lecture experience. It seemed improbable that students had not been exposed to these teaching methodologies, especially lecture. For example, the students participating in this study had been enrolled in the nursing program for seven months. During that time the likelihood of their not being exposed to lecture or demonstration strategies was extremely remote. Furthermore, they were all high school graduates who had completed some science classes which generally use classroom lectures and labs, during which demonstrations are likely to occur. Possibly the participants did not understand the terminology that was used on the Demographic Data Questionnaire to identify the instructional strategies. This would explain the unusual response of no exposure to the popular lecture and demonstration strategies.

Because of their distributions, the lecture and demonstration means were exempted from analysis for significance. When the remaining strategies were analyzed, there were no significant differences among the means of students with and without simulation, problem-based learning, and seminar experiences. Consequently, the selected strategies did not appear to be confounding or moderating instructional preferences. However,

there are other teaching strategies and instructional preferences that were not investigated in this study.

One of the purposes of this research was to identify significant differences in the instructional preferences of students intending to complete the program with a diploma or a degree. Logic and previous teaching experiences implied that demographic variables, financial constraints, and/or family responsibilities could influence the selection of intended completion programs and confound the resultant preference findings. According to chi-square analysis, age, marital status, number of dependents, pre-entry academic achievement, financial concerns, and family responsibilities were significantly related to the completion program students intended to pursue. These findings were consistent with the developmental level of the respondents and the socioeconomic considerations at the time of the study. High unemployment, rising tuition costs, and tenuous job security were real concerns for students in Edmonton in 1993. Since intended completion program plans tended to be susceptible to changes in demographics and circumstances, the preference findings for the degree and diploma students may change with a different group of subjects.

Implications

The findings reported for this study contained implications for both practical application and research. Practical implications were based on the identification and reporting of relationships, group preferences, and differences between instructional preferences. Research implications evolved from problems inherent in the collection of data.

For Practical Application

The practical implications arising from the study findings related primarily to the teaching-learning situation and student assessment. The applications involve both students and nurse educators.

Teaching-Learning Situation. The dimension means for this study varied from a high score for the collaborative dimension declining through dependent, participant, independent, and competitive scores, to a low mean for the avoidant dimension. Although there were no statistically significant mean differences for the dependent or collaborative preferences, there were significant differences among the independent, competitive, avoidant, and participant means by demographic groups. These findings suggest some kind of prioritization, ranking, or hierarchy, which identifies the social conditions that are most important to the learners in a teaching-learning situation. According to the literature, the interpersonal demands of the teaching strategies employed in nursing education vary (Bevis, 1989a; de Tornyay & Thompson, 1987). Therefore, the connotation is that nurse educators could consider preferences when selecting teaching strategies that would be most likely to motivate students to learn, or they could group students according to their preferences for learning experiences. By extension, there is an implication that policies, practices, learning resources, and physical design of the educational facility should be modified to support specific preferences. However, learning style literature is inconclusive regarding the benefits of modifying a facility to support one or more instructional preferences exclusively (Garity, 1985; Linares, 1989; Newble & Entwistle, 1985; Partridge, 1983).

Although there are benefits from matching instructional preference to classroom activities, there are some disadvantages and other considerations (Dunn & Griggs, 1988, 1988; Grasha, 1983; Rule & Grippin, 1988). For example, the study results were generated from individual profiles, and were reported as score ranges and means. This implies that unique, individual variations are subsumed in the group profile. If teachers respond to group profiles by matching them with the instructional strategy, then some of the unique preferences of the individual may be ignored. According to some researchers, if students are grouped according to their instructional preferences and taught with a compatible teaching strategy, their learning skills may be stifled (Garity, 1985; Partridge,

1983). Findings such as these imply that students should be given a choice of teaching strategies for at least some of their courses or classes. This would insure that their individual preferences were occasionally accommodated, and that their learning skills were challenged and/or developed.

Regardless of whether they are matched or challenged, there appears to be value in formally identifying the instructional preference of each student. Although the findings in this study were compatible with those of previous research, there were sufficient variations to suggest that nurse educators should formally identify the instructional preferences of each new group of students. It cannot be assumed that subsequent groups of collaborative nursing students will express the same instructional preferences as the subjects in this study.

Student Assessment. Overall, the students in this study tended to prefer interpersonal instructional circumstances, but not all students were so inclined. In addition, preferences differed significantly according to age, pre-entry academic achievement and intended completion program. These findings suggest that perceived instructional preferences are individual and unique to each nursing student. By formally identifying these individual differences through the use of assessment instruments, nurse educators could determine potential incompatibilities between the students' predispositions and program demands. Consequently, counseling or assistance to develop weaker instructional skills could be offered to students at risk. At the very least, sharing such personal assessments would provide students with the opportunity for increased self-awareness and understanding. Furthermore, reported preferences could be compared with desirable nurse attributes such as self-direction, independence, collaboration, cooperation, and working with others (Bevis, 1989b; Merritt, 1989). The results could be used by educators and counselors for assessing potential applicants to schools of nursing. In addition, the findings could be used by educators and/or individual

students to evaluate the progress with which such characteristics were being developed as a consequence of program and student endeavors.

For Research

The research implications spawned by the findings in this study relate to methods to improve data collection and reliability. Through experience with the instruments and procedures, areas for improvement and alternate approaches were suggested.

Improving Data Reliability. In the first situation with reliability implications, the experts identified some of the items on the GRSLSS as inappropriate for nursing students. This suggests that further evaluation and refinement of the items may be appropriate, especially with regard to the two items in the avoidant dimension upon which there was mutual agreement from the experts. However, in this study, the expert data were obtained in a subjective format with no opportunity for the experts to provide feedback that could have facilitated instrument revisions. Consequently, the benefits of future expert input would be increased by requesting an explanation of the rationale for considering an item inappropriate to a dimension. In lieu of this, some type of follow-up interview could be used, or written suggestions for improving inappropriate dimension measurements could be requested. Since the nurse educators selected as experts in this study may have been unfamiliar with the terminology associated with the instructional preference concept, there may be greater value in obtaining feedback from non-nurse experts with an adult education background.

Secondly, the identification and reporting of instructional preferences for a group of nursing students implies that the findings are permanent and congruent with demonstrated classroom and clinical actions. According to the literature, instructional preference is susceptible to change and the persistence of preferences over time has not been thoroughly investigated for adults (Curry, 1983a). Consequently, there is a need to substantiate the reported results with observations and interviews, and to re-evaluate the preferences at different points in the program. Perhaps preferences could be determined

at each level of the program or upon entry and graduation. This type of validation is especially critical if instructional preference data are to be used as an aid for student selection, program evaluation, and course planning activities.

Improving Data Collection. Response rates may be a problem in situations where self-report measurements are used. In this study, questionnaires that were completed and returned outside of the classroom were returned at approximately half the rate of those completed and returned in conjunction with a class. Although there were no significant differences in the preferences by collection groups in this case, sample size can affect significance tests, so the greatest response rate is desirable. Therefore, there is implied value in arranging for questionnaires to be circulated and completed during, or at the completion of, a regularly scheduled class, so they can be returned immediately.

A second implied improvement for data collection arose from the investigation of potential confounding variables, specifically the relationship between respondents' experiences with teaching strategies and their instructional preferences. Although there were no significant relationships between preference and the selected instructional strategies, there are several other teaching strategies that were not addressed. Consequently, future research is required to determine if these other strategies are significantly related. Furthermore, there were some students who claimed no experiences with lecture and/or demonstration strategies, a questionable finding. Since the terminology used in this study for instructional strategies may not have been clearly understood by all participants, the five strategies should be re-evaluated using a format that provides clear definitions and/or descriptions.

Recommendations

For Further Research

Replication is the first recommendation for future research. The findings from this study may be tentatively generalized to first year nursing students in the collaborative nursing program. However, to confirm the findings, the study should be repeated with

subsequent groups of first year students, using the GRSLSS with other instructional preference measurements. The findings should also be confirmed for their temporal reliability by repeating the instructional preference assessment with the same group of students at the end of the program and comparing the results with the original findings. Furthermore, the instructional preferences of other groups of nursing students need to be identified and compared with findings such as those from this study.

The second research recommendation is to determine the relationship between perceived and actual preferences. For example, it is unknown if the impersonal and interpersonal instructional preferences reported in this study are related to behaviors that students actually demonstrate. Therefore, student preferences, as demonstrated through classroom and clinical practices, need to be identified and correlated with reported preferences. In particular, confirmation of the negative relationship between the avoidant and participant dimensions, identified in this and other research, could have useful practical consequences. This finding suggests that students prefer to actively involve themselves in learning activities that maximize the learning and benefits for all, or they prefer to avoid classroom learning that requires interaction with teachers and/or peers. If students actually demonstrate this behavior, several options become available. By formally identifying the instructional preferences of students at the beginning of a course or program, nurse educators could obtain information whereby preferences could be related to teaching strategies. Conversely, students could be grouped and matched with instructional strategies. By determining the compatibility between the student's preference and the teaching strategy, students with potential problems could be counseled to facilitate their obtaining maximum benefits from the strategies available.

The third recommendation for future research concerns the investigation of relationships among instructional preferences and practical nursing education situations. For example, the significance of the relationships between students' instructional

preferences and their evaluations of a teaching strategy or their learning success could provide useful information relative to the need to match preferences with strategies.

The fourth research recommendation concerns further validation of Curry's (1990b) learning style taxonomy. As a consequence of this study, the instructional preferences of students were identified in terms of some interpersonal social conditions. However, the identification and validation of other variables applicable to social conditions needs to be explored. According to Curry's taxonomy, there are social and environmental instructional preferences that impact on motivation. Therefore, further investigation is required to determine the relationship between the social and environmental conditions comprising instructional preference, and the effect they have on motivation. In addition, the relationship between these components and psychosocial aspects such as self-esteem requires further study.

For Practical Application

The one practical recommendation arising from this research relates to increasing the awareness of students and nurse educators concerning instructional preference. Generally, researchers and theorists support the idea of determining students' learning styles, and discussing the results with the students in order to promote their understanding and knowledge of themselves and their perceptions. The GRSLSS provides information about the students' instructional preferences and is accompanied by explanations for the dimensions. In this study, students did not appear to have difficulties completing the questionnaires. At the very least their completion of the questionnaires introduced them to the concept of instructional preferences, and the idea of data collection as a research component with application potential. Consequently, identifying instructional preferences appears more beneficial than harmful. Furthermore, this type of awareness could be promoted by encouraging students to determine their learning preferences in conjunction with class discussions of teaching and learning theory.

As DeBello (1989) noted, informal observation results in insufficient information about learning characteristics. Consequently, identifying and discussing students' instructional preferences with the nurse educators who are teaching them may help to explain student behaviors and provide some direction for course planning. It is recommended that nurse educators provide students with an opportunity to complete an instructional preference instrument and that the results be made available to the students. Assuming that content and teaching circumstances provide some latitude, it is also suggested that instructors develop classroom strategies such that a student's preferences are matched at least part of the time. Furthermore, to heighten the research and instructional preference sensitivities of the nurse educators, research data should be shared and potential applications discussed in inservice or workshop situations.

Conclusion

This study investigated the instructional preferences of nursing students as reported through their responses to items on the Grasha-Riechmann Student Learning Style Scales. The findings suggested that students in the 1992 entry collaborative nursing program have both impersonal and interpersonal preferences, one of which may be expressed more strongly. Furthermore, there was a substantial negative relationship between participant and avoidant preferences. In addition, age, pre-entry academic achievement, and intended completion program significantly influenced some instructional preferences. Since the findings have implications for future nursing research and educational practices, further replication and expansion of study results is recommended. Notwithstanding the need for further investigation, the findings support the formal determination of students' instructional preferences by nurse educators. Once identified, the preferences could be used by nurse educators, counselors, and the students themselves to enhance learning experiences.

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Appendix A

Grasha-Riechmann Student Learning Style Scales

I. D. Number _____

The following questionnaire has been designed to help you clarify your attitudes and feelings toward the courses you have taken thus far in your education. There are no right or wrong answers to each question. However, as you answer each question, form your answers with regard to your general attitudes and feelings towards all of your courses.

Read each statement and decide to what extent you would agree or disagree with it as an indication of your general feeling and attitudes towards all educational experiences. Circle:

SD if you **strongly disagree** with the statement.
D if you **moderately disagree** with the statement.
U if you are **undecided**.
A if you **moderately agree** with the statement.
SA if you **strongly agree** with the statement.

1. I am confident of my ability to learn important course material. ..... SD D U A SA
2. I often daydream during class. ..... SD D U A SA
3. Working with other students on class projects is something I enjoy. ..... SD D U A SA
4. Facts presented in textbooks and lectures usually are correct. ..... SD D U A SA
5. To do well, it is necessary to compete with other students for the teacher's attention. ..... SD D U A SA
6. I usually am eager to learn about the content areas covered in class. ..... SD D U A SA
7. My ideas about content are often as good as those in the textbook. ..... SD D U A SA
8. Classroom activities generally are boring. ..... SD D U A SA
9. I enjoy discussing my ideas about course content with other students. ..... SD D U A SA
10. Teachers are the best judges of what is important for me to learn in a course. ..... SD D U A SA
11. It is necessary to compete with other students to get a grade. ..... SD D U A SA
12. Class sessions typically are worthwhile. ..... SD D U A SA
13. I study what is important to me and not always what the instructor says is important. ..... SD D U A SA
14. Very seldom do I become excited about material covered in a course. ..... SD D U A SA
15. I enjoy hearing what other students think about issues raised in class. ..... SD D U A SA
16. Teachers should state exactly what they expect from students. ..... SD D U A SA
17. During class discussions, I must compete with other students to get my ideas across. ..... SD D U A SA
18. I get more out of going to class than staying at home. ..... SD D U A SA
19. Most of what I know, I learned on my own. ..... SD D U A SA
20. I generally feel like I have to attend class, rather than like I want to attend. ..... SD D U A SA
21. Students can learn more by sharing their ideas with each other. ..... SD D U A SA
22. I try to do assignments exactly the way my teachers say they should be completed. ..... SD D U A SA
23. Students have to become aggressive to do well in school. ..... SD D U A SA
24. Everyone has a responsibility to get as much out of a course as possible. ..... SD D U A SA
25. I can determine for myself the important content issues in a course. ..... SD D U A SA

26. Paying attention during class sessions is difficult for me to do. ....SD D U A SA
27. I like to study for tests with other students. ....SD D U A SA
28. Teachers who let students do whatever they want are not doing their jobs. ....SD D U A SA
29. I like to get the answers to problems or questions before anybody else can. ....SD D U A SA
30. Classroom activities generally are interesting. ....SD D U A SA
31. I like to develop my own ideas about course content. ....SD D U A SA
32. I have given up trying to learn anything from going to class. ....SD D U A SA
33. The ideas of other students help me to understand course material. ....SD D U A SA
34. Students need to be closely supervised by teachers on all course related projects. ....SD D U A SA
35. To get ahead in class, it is necessary to step on the toes of other students. ....SD D U A SA
36. I try to participate as much as I can in all aspects of a course. ....SD D U A SA
37. I have my own ideas about how classes should be run. ....SD D U A SA
38. In most of my courses, I study just hard enough to get by. ....SD D U A SA
39 An important part of taking courses is learning to get along with other people. ....SD D U A SA
40. My notes contain almost everything the teacher said in class. ....SD D U A SA
41. Students hurt their chances for a good grade when they share their notes and ideas. ....SD D U A SA
42. Course assignments are completed whether or not I think they are interesting. ....SD D U A SA
43. If I like a topic, I usually find out more about it on my own. ....SD D U A SA
44. I typically cram for exams. ....SD D U A SA
45. Learning should be a cooperative effort between students and faculty. ....SD D U A SA
46. I prefer class sessions that are highly organized. ....SD D U A SA
47. To stand out in my classes, I try to do assignments better than other students. ....SD D U A SA
48. I complete course assignments soon after they are given. ....SD D U A SA
49. I prefer to work on class related projects (e.g. studying for exams, papers) by myself. ....SD D U A SA
50. I would like teachers to ignore me in class. ....SD D U A SA
51. I let other students borrow my notes when they ask for them. ....SD D U A SA
52. Teachers should tell students exactly what material is going to be covered on a test. ....SD D U A SA
53. I like to know how well other students are doing on exams and course assignments. ....SD D U A SA
54. I complete required reading assignments as well as those that are optional. ....SD D U A SA
55. When I don't understand something, I try to figure it out for myself before seeking help. ....SD D U A SA
56. During class, I tend to talk or joke around with people sitting next to me. ....SD D U A SA
57. Participating in small group activities in class is something I enjoy. ....SD D U A SA
58. I find teacher outlines or notes on the board very helpful. ....SD D U A SA
59. I ask other students in class what grades they received on tests and assignments. ....SD D U A SA
60. In my classes, I often sit towards the front of the room. ....SD D U A SA

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Appendix B

Interpretation of Dimension of the Grasha-Riechmann Student Learning Style Scales

Competitive: Students learn material in order to perform better than others in the class. They feel they must compete with other students in a course for the rewards that are offered.
Preferences - being a group leader in a discussion; teacher-centered instructional procedures; being singled out in class for doing a good job; dominating discussions; class activities where performance is compared.

Collaborative: Students feel they can learn by sharing ideas and talents. They cooperate with teacher and peers and like to work with others.
Preferences - Lectures with class discussions in small groups; small seminars; student-designed aspects of courses; group rather than individual projects.

Avoidant: Students not enthusiastic about learning content and attending class. Do not participate with students and teachers in the classroom. They are uninterested and overwhelmed by what goes on in class.
Preferences - Generally turned off by most classroom activities; dislike tests; like blanket grades where everyone gets a passing grade; dislike enthusiastic teachers.

Participant: Good citizens in class. Students enjoy going to class and take responsibility for getting the most out of a course. Want to take part in as much of the course activity as possible.
Preferences - Lectures with discussion; opportunities to discuss material; class reading assignments; teachers who can analyze and synthesize information well.

Dependent: Students show little intellectual curiosity and learn only what is required. They view teacher and peers as sources of structure and support and look to authority figures for specific guidelines on what to do and how to do it.
Preferences - Outlines or notes on the board; clear deadlines and instructions for assignments; teacher-centered classroom methods; as little ambiguity as possible in all aspects of courses.

Independent: Students like to think for themselves. They prefer to work on their own but will listen to the ideas of others in the classroom. Learn the content they feel is important and are confident in their learning abilities.
Preferences - Independent study; working alone; self-paced instruction; assignments that permit independent thinking; student-designed projects; student-centered rather than teacher-centered course designs.

Note. From The Grasha-Riechmann Student Learning Style Scales (pp. 84 - 85) by S. Riechmann-Hruska and A. Grasha, 1982, in Student Learning Styles and Brain Behavior, Reston, VA: National Association of Secondary School Principals. Copyright 1982 by National Association of Secondary School Principals. Adapted by permission.

Appendix C

Demographic Data Questionnaire

1992 Entry I. D. Number _____

1. How old were you on January 1, 1993? _____

2. Gender
   ___ 1. Male
   ___ 2. Female

3. What is your current marital status?
   ___ 1. Single, never married
   ___ 2. Married
   ___ 3. Separated, divorced, widowed
   ___ 4. Other - please specify _____

4. How many individuals are dependant on you for physical, legal or financial support? (Please indicate the number excluding yourself.)
   ___ 1. None
   ___ 2. One
   ___ 3. Two
   ___ 4. Three
   ___ 5. Four or more - please specify exact number _____

5. What was your HIGHEST level of academic achievement before admission to the nursing program? (Check one only)
   ___ 1. High school diploma or equivalent
   ___ 2. Some college level courses
   ___ 3. Some university level courses
   ___ 4. Diploma or certificate Please specify _____
   ___ 5. Baccalaureate degree Please specify _____
   ___ 6. Other

6. With which of the following instructional strategies have you had personal experience as a result of coursework before or during the nursing program? (Check as many as necessary)
   ___ 1. Lecture
   ___ 2. Simulation
   ___ 3. Problem-based learning
   ___ 4. Seminar
   ___ 5. Demonstration

7. If you had no other factors to consider, would you choose to complete the nursing program:
   ___ 1. Through the third and fourth year baccalaureate degree option
   ___ 2. Through the six month diploma exit option

8. Are financial concerns a major factor in your selection of program completion route?
   ___ 1. Yes
   ___ 2. No

9. Are family responsibilities a major factor in your selection of program completion route?
   ___ 1. Yes
   ___ 2. No

10. At this time, do you intend to complete the nursing program:
   ___ 1. Through the third and fourth year baccalaureate degree option
   ___ 2. Through the six month diploma exit option

Appendix D

Face Validity Assessment

Please consider each item in relation to the title under which it is located. If you believe the item represents behavior appropriate to the category, please check yes. If you do not think the behavior is concerned with the category, please check no.

	Yes	No
Independent		
I am confident of my ability to learn important course material.		
My ideas about content are often as good as those in the textbook.		
I study what is important to me and not always what the instructor says is important.		
Most of what I know, I learned on my own.		
I can determine for myself the important content issues in a course.		
I like to develop my own ideas about course content.		
I have my own ideas about how classes should be run.		
If I like a topic, I usually find out more about it on my own.		
I prefer to work on class related projects (e.g. studying for exams, papers) by myself.		
When I don't understand something, I try to figure it out for myself before seeking help.		
Avoidant		
I often daydream during class.		
Classroom activities generally are boring.		
Very seldom do I become excited about material covered in a course.		
I generally feel like I have to attend class, rather than like I want to attend.		
Paying attention during class sessions is difficult for me to do.		
I have given up trying to learn anything from going to class.		
In most of my courses, I study just hard enough to get by.		
I typically cram for exams.		
I would like teachers to ignore me in class.		
During class, I tend to talk or joke around with people sitting next to me.		
Collaborative		
Working with other students on class projects is something I enjoy.		
I enjoy discussing my ideas about course content with other students.		
I enjoy hearing what other students think about issues raised in class.		
Students can learn more by sharing their ideas with each other.		
I like to study for tests with other students.		
The ideas of other students help me to understand course material.		
An important part of taking courses is learning to get along with other people.		
Learning should be a cooperative effort between students and faculty.		
I let other students borrow my notes when they ask for them.		
Participating in small group activities in class is something I enjoy.		

	Yes	No
Dependent		
Facts presented in textbooks and lectures usually are correct.		
Teachers are the best judges of what is important for me to learn in a course.		
Teachers should state exactly what they expect from students.		
I try to do assignments exactly the way my teachers say they should be completed.		
Teachers who let students do whatever they want are not doing their jobs.		
Students need to be closely supervised by teachers on all course related projects.		
My notes contain almost everything the teacher said in class.		
I prefer class sessions that are highly organized.		
Teachers should tell students exactly what material is going to be covered on a test.		
I find teacher outlines or notes on the board very helpful.		
Competitive		
To do well, it is necessary to compete with other students for the teacher's attention.		
It is necessary to compete with other students to get a grade.		
During class discussions, I must compete with other students to get my ideas across.		
Students have to become aggressive to do well in school.		
I like to get the answers to problems or questions before anybody else can.		
To get ahead in class, it is necessary to step on the toes of other students.		
Students hurt their chances for a good grade when they share their notes and ideas.		
To stand out in my classes, I try to do assignments better than other students.		
I like to know how well other students are doing on exams and course assignments.		
I ask other students in class what grades they received on tests and assignments.		
Participant		
I usually am eager to learn about the content areas covered in class.		
Class sessions typically are worthwhile.		
I get more out of going to class than staying at home.		
Everyone has a responsibility to get as much out of a course as possible.		
Classroom activities generally are interesting.		
I try to participate as much as I can in all aspects of a course.		
Course assignments are completed whether or not I think they are interesting.		
I complete course assignments soon after they are given.		
I complete required reading assignments as well as those that are optional.		
In my classes, I often sit towards the front of the room.		

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Thank you for your time and effort on my behalf.

Appendix E

Data Coding for Demographic Questionnaire and GRSLSS

	Column #
I. D. Number _____ Entry Number _____	01-02/
1. How old were you on January 1, 1993? _____ (Age group)	03/
2. Gender	
___ 1. Male	04/
___ 2. Female	
3. What is your current marital status?	
___ 1. Single, never married	
___ 2. Married	05/
___ 3. Separated, divorced, widowed	
___ 4. Other - please specify _____	
4. How many individuals are dependant on you for physical, legal or financial support?	
___ 1. None	
___ 2. One	
___ 3. Two	06/
___ 4. Three	
___ 5. Four or more - please specify exact number _____	
5. What was your HIGHEST level of academic achievement before admission?	
___ 1. High school diploma or equivalent	
___ 2. Some college level courses	
___ 3. Some university level courses	07/
___ 4. Diploma or certificate Please specify _____	
___ 5. Baccalaureate degree Please specify _____	
___ 6. Other	
6. With which of the following instructional strategies have you had personal experienceas a result of coursework before or during the nursing program? (Check as many as necessary)	
___ 1. Lecture	08/
___ 2. Simulation	09/
___ 3. Problem-based learning	10/
___ 4. Seminar	11/
___ 5. Demonstration	12/
6. If you had no other factors to consider, would you choose to complete the program:	
___ 1. Through the third and fourth year baccalaureate degree option	13/
___ 2. Through the six month diploma exit option	
7. Are financial concerns a major factor in your selection of program completion route?	
___ 1. Yes	14/
___ 2. No	
8. Are family responsibilities a major factor in your selection of program completion route?	
___ 1. Yes	15/
___ 2. No	
9. At this time, do you intend to complete the program:	
___ 1. Through the third and fourth year baccalaureate degree option	16/
___ 2. Through the six month diploma exit option	
Independent Dimension Mean	17/
Avoidant Dimension Mean	18/
Collaborative Dimension Mean	19/
Dependent Dimension Mean	20/
Competitive Dimension Mean	21/
Participant Dimension Mean	22/

Appendix F

Protocol for Research

Edmonton and Red Deer Nursing Program: Collaborative Program

Policy:

1. The approval of the Administrative Council is required for any research related to the program and involving more than one site, or for access to raw or aggregate data collected as part of the program evaluation.

2. A proposal for research approval must be accompanied by an ethical approval from the sponsoring organization. Student proposals must also be accompanied by a copy of the approval by the student's supervisory committee.

3. Approval of a research proposal will be based on the effect the research would have on the Collaborative Program, the students and the staff.

4. The Collaborative Evaluation and Research Committee (CERC) will be informed of all research related to the Collaborative Program so that a registry of research may be maintained as part of its repository function. These will be treated as confidential documents.

Procedure:

1. Research involving one site only: Persons wishing to conduct research in one site only would have their proposal approved at that site according to its own internal research approval protocol. The site approving the research should forward a copy of the proposal to the Collaborative Evaluation and Research Committee to be retained on the research registry.

2. Research involving more than one site: Persons wishing to conduct research in more than one site should send a research proposal accompanied by an ethical approval and, if applicable, committee approval to the Administrative Council. If the Administrative Council wishes to consider the research they will forward it to the Collaborative Evaluation and Research Committee to review and make a recommendation. The CERC recommendation will be forwarded to the Administrative Council for a decision.

3. Use of raw or aggregate data: Any researcher wishing access to raw or aggregate data should submit a research proposal including an ethical approval and, if applicable, committee approval to the Administrative Council. The Administrative Council will, if they wish to consider the proposal, forward it to CERC for a recommendation. The CERC recommendation will be forwarded to the Administrative Council for a decision.

Approved by ERDMP: CM Administrative
Council on October 18, 1991

Appendix G

Consent to Use Data from Questionnaires and Inventories

PROJECT TITLE: Instructional Preferences of Students in a Formal Learning Situation in a New Collaborative Nursing Program.

INVESTIGATOR: Avalean Loerke, RN, BSN,
School of Nursing,
University of Alberta Hospitals,
8440 - 112 Street,
Edmonton, Alberta,
T6G 2B7.
Phone: 467-7586

I am inviting you to participate in research that I am conducting as part of my master's program at the University of Alberta. My study investigates how students in the collaborative nursing program prefer to learn in formal teaching-learning situations. This type of information may help nurse educators when they are deciding how to teach their courses. You are being asked to complete two forms: the Grasha-Riechmann Student Learning Style Scales, and the Demographic Data Questionnaire. The forms demand very little writing, and you will probably be able to complete them in 30 minutes or less.

There is no cost or risk associated with your participation. You are free to withdraw from the study at any time by contacting me. Your name does not appear on the questionnaires so your name is not related to any information obtained and used. All forms and computer discs will be kept in a secure location. Group results of the study may be used for educational purposes and may be presented to others verbally or in writing. If your responses are used again for further research, appropriate ethical approval will be obtained.

For your own use, I will create an individual profile of your likes when you are learning something new. This will be forwarded to you in a sealed envelope. To enable me to do this, you are being asked to print your name on a card with an identification number. I will destroy the card once your profile is sent to you. Your name will not be recorded on any disc or list.

My supervisor and I are willing to answer any of your questions now or in the future. As the investigator, I may be contacted at the address and phone number at the top of the page. My supervisor is Dr. Dana Hames-Wertenberger, Director, School of Nursing at the University of Alberta Hospitals. She can be contacted by phoning 492-4851 or by writing to her at the same mailing address as mine. If you are willing to participate in the study, I would appreciate your signing the following authorization. You may keep a copy of this form for reference.

Authorization

I have received a copy of the explanation and consent for this study and have had an opportunity to have my questions answered. I understand what the study is about and what I am being asked to do. I will permit my responses on the Grasha-Riechmann Student Learning Style Scales and the Demographic Data Questionnaire to be used for this study.

_____
(Participant's Name - printed)

_____ _____
(Participant's Signature) (Date)

_____ _____
(Researcher's Signature) (Date)

Appendix H

Guideline Enclosure for Data Collection Package

Just a few reminders, if you are willing to participate.

1. Please sign and date both copies of the Authorization, keep one copy and return the other in the envelope.
2. Please print your name on the index card with the number before returning it.
3. You may use pen or pencil and answer directly on the Demographic Questionnaire and the Grasha-Riechmann Student Learning Style Scales, but please do not write your name anywhere on them.
4. The questionnaires can be completed in any order, but please check that they are both complete.
5. There are no right or wrong responses. Read each statement on the Grasha-Riechmann Student Learning Style Scales and decide to what extent you would agree or disagree with the statement according to the way you feel overall about all of your courses before and after entering the nursing program. This is not a test, so please don't puzzle over the statements just be as honest as you can.
6. When you have finished with the questionnaires, place them in the envelope with the signed consent and the completed card.
7. Seal the envelope and return it to **Jean at the Reception Desk of the UAH School of Nursing on or before 1600 on Wednesday, March 3, 1993**.

Thank you for your participation. I appreciate your time and opinions.

Appendix I

Script Introducing Subjects to the Study

My name is Av Loerke, and I'm a graduate student in the Master of Nursing program at the University of Alberta. I'm here today to invite you to participate in a survey that I'm conducting to find out how students in the collaborative nursing program prefer to learn. Little is known about the learning preferences of Canadian nursing students and I feel this information is important. It is helpful for teachers and it may also help you learn something about yourselves. All my survey activities are supervised and approved by Dr. Wertenberger, a nursing faculty member at the University of Alberta and the Director of the University of Alberta Hospitals School of Nursing. Each of you has received a brown envelope containing two questionnaires, two copies of the consent form, and a card with a number on it. It will take you about 30 minutes or less to provide the information required and there is little writing involved. If you decide to participate, you will receive a personal profile of your preferences.

At this time I would like you to locate and read the Consent to Use Data from Questionnaires and Inventories. *Pause*. Are there any questions? If not, I would like you to read the Authorization and sign both copies of it if you are willing to complete the questionnaires. You are under no obligation to participate and there are no consequences for not participating. If you are unwilling to complete the questionnaires, please place the material in the envelope and return it to me. Thanks for considering my proposal. You are free to go.

If you are willing to participate and have signed both copies of the Authorization, keep one copy and place the other in the envelope. Please print your name on the index card with the number and place it in the envelope. Proceed with the Demographic Questionnaire and the Grasha-Riechmann Student Learning Style Scales. You may use pen or pencil and answer directly on both of these questionnaires, but please do not write your name anywhere on them. The questionnaires can be completed in any order, but please check that they are both complete. Remember there are no right or wrong responses. Read each statement on the Grasha-Riechmann Student Learning Style Scales and decide to what extent you would agree or disagree with the statement according to the way you feel overall about all of your courses. This is not a test, so please don't puzzle over the statements just be as honest as you can. When you have finished with the questionnaires, place them in the envelope and return the envelope to me on your way out.

Thanks for participating and giving me your time and opinions.

Appendix J

Grasha-Riechmann Student Learning Style Scales Individual Profile

I.D. Number	123					
	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant
	4	1	2	4	1	5
	3	2	5	4	1	4
	4	4	5	5	2	5
	1	2	5	5	1	5
	2	2	2	4	2	4
	5	1	5	1	1	5
	4	2	5	4	1	5
	4	3	5	5	2	2
	4	1	4	5	2	3
	4	4	4	5	2	1
Total	35	22	42	42	15	39
Mean	3.5	2.2	4.2	4.2	1.5	3.9

Note. The above are the item scores, totals, and means for each dimension resulting from the responses on your questionnaire. The higher the mean, the stronger the preference for that style or characteristic. Please see back of page for an explanation of the dimensions.

Norms for Each Learning Style Scale by Age						
	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant
17 - 21	3.34	2.18	3.67	3.34	2.76	3.91
22 - 28	3.28	1.96	3.72	3.45	2.68	4.03
29 -33	3.41	1.99	3.77	3.37	2.69	4.07
34 - 40	3.42	1.76	3.69	3.39	2.70	4.21
41 - 45	3.47	1.74	3.62	3.42	2.68	4.32
45+	3.46	1.66	3.78	3.29	2.60	4.35

Note. Grasha, A. F. (1990, February). [Research files of college student responses to the Grasha-Riechmann Student Learning Style Scales]. Unpublished data. Copyright 1990 by Dr. A. F. Grasha. Reprinted by permission.